
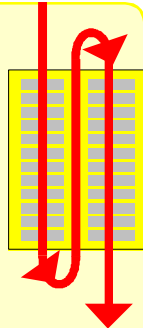



Instructions

Scrolling through a two-column document on-screen from the bottom of one column to the top of the next, and so on, can get very tedious.  Fortunately, "column threading" is automatic with this software. Here are the basic tools and techniques that you need to know to efficiently navigate through the columns in this document ...



1. Click on the hand tool in the button bar. 

2. Whenever the hand cursor is positioned over a column, the cursor changes to the "read article cursor",  and "Read Article" appears in the status bar to indicate that this text is part of an "article". *An article is a collection of columns selected by the editor that comprise one subject, like one of the articles on the front page of a newspaper. Each first-level section (1.1, 1.2, 1.3...) of the NTIA Manual has been defined as a separate article.* Click any part of the article to start reading at that point, or control-click to start at the beginning of the article. The cursor now changes to the follow-article cursor, and "Follow Article" appears in the status bar.



3. To page down, simply click the mouse, or use the scrollbar, or press the PageDown key. *You can keep track of where you are on the page if you're using the thumbnails-and-page view. In this view a selection rectangle moves over a thumbnail of the page as you scroll through the columns in the page view window.*



4. You can continue to click until you reach the end of the article. At the end of the article, the cursor changes to the end-article cursor, and "End Article" appears in the status bar. Click again to return to the page view displayed before you started reading the article. Click the fit page button.


5. If you want to exit before the end of the article...

- select any navigation method (but not Enter or Return)
- Go to another article or page
- Hold down Shift + Ctrl and click.



6. You can also select which article (NTIA Manual Section) to view by choosing “Articles...” from the View menu, and then selecting the article you want from the dialog box that appears. *You can keep* this dialog box displayed so you can go from one article to another, or better yet, use the bookmarks method described in #7 below.

7. The **best way** to select which article (NTIA Manual Section) to view is to switch to the “Bookmarks-and-Page” view, click  on the section name bookmark, **click with the hand cursor on the page**, then navigate with the hand tool as described in #1-5 above. Links to all of the sections are provided — as well as links to tables, figures, endnotes, and even these instructions.

8. To select text within a column, click the text selection tool, hold down the Control key, and drag to select the text you want to copy. 

CHAPTER 8

Procedures and Principles for the Assignment and Coordination of Frequencies

8.1 AUTHORIZING FREQUENCY USAGE

8.1.1 General Procedure for Authorizing Frequency Usage

1. Each Government agency decides, in the light of policies, rules, regulations, frequency allocations, and availability of frequencies, whether, what, and how many mission requirements can be fulfilled by using telecommunications systems. Each agency makes the necessary technical studies, selects potential frequencies, coordinates with other agencies involved, and prepares and files an application with the NTIA, Office of Spectrum Management (OSM), Frequency Assignment and IRAC Administrative Support Division (FA& IASD), for consideration by the Frequency Assignment Subcommittee (FAS) of the IRAC.

2. The FCC FAS Representative submits frequency assignment applications for non-Government use of the spectrum in shared bands and other bands where there might be an impact on, or from, Government operations. The FCC, as a Government entity, also submits frequency requests to the FAS for FCC spectrum requirements.

3. The OSM/FA&IASD, using a combination of computer and manual procedures, reviews the applications for accuracy, completeness, and compliance with regulations and procedures. The FAS agendas are distributed to each FAS member agency for study regarding the protection of their existing assignments. OSM/FA&IASD reviews the agendas to ensure adequate justification, compliance with policy and regulations, technical appropriateness, potential for major problems, whether or not spectrum support for the system, if applicable, has been certified by the Spectrum Planning Subcommittee (SPS) of the IRAC, and whether there is a conflict with the assignments of the FAS non-member agencies.

4. The FAS considers pending items on a daily basis and takes action within established policy

guidelines. When additional policy guidance is needed, agreement cannot be reached, the IRAC has so directed, or an agency so requests, applications are referred to the IRAC. Matters that cannot be resolved with the IRAC, those that NTIA directs, or those requested by an agency, are referred to the Deputy Associate Administrator, Office of Spectrum Management, NTIA, who resolves them or refers them to the Administrator, NTIA, for decision. Government frequency assignment decisions made by the Administrator, NTIA, may be appealed to the Director of the Office of Management and Budget (OMB) per paragraph 3-2 of Executive Order 12046.

5. Matters of considerable importance, such as changes to the National Tables of Frequency Allocations, significant Government use of non-Government frequency bands, and advice to the Department of State, are recommended to NTIA for consultation with the FCC or other appropriate agencies. Although Government applications are not heard in public for security reasons, the public is represented by the FCC who may object, concur, or give tacit approval.

6. The Government Master File (GMF) will be updated weekly to reflect those frequency assignment actions agreed upon by the FAS and approved by the Deputy Associate Administrator, Office of Spectrum Management, NTIA, and, for electromagnetic compatibility analysis purposes, those Canadian assignments along the U.S./Canada border that have been coordinated with the U.S. Government frequency management community under the provisions of the U.S./Canada Coordination Agreement (see Part 3.4).

a. Upon request, the GMF data, including extracts or the entire GMF on CD-ROM, will be distributed by NTIA to Federal Government agencies. However, since the GMF data is classified CONFIDENTIAL, it shall be distributed only in accordance with the provisions of Executive Order 12958, as amended.

b. Upon request, NTIA will issue written

authorization for those frequency assignment applications which are approved.

c. Requests for distribution of the GMF, extracts thereof, and other listings must be made through the agency's IRAC or FAS representative and directed to:
Chief, Frequency Assignment and IRAC
Administrative Support Division
NTIA, Room 1605
U.S. Dept. of Commerce
14th & Constitution Ave, NW
Washington, D.C. 20230

8.1.2 Authorizing Frequency Assignments to Stations of Foreign Governments in Washington, D.C.

1. Public Law 87-975 amended the Communications Act of 1934 by adding subsection 305(d) which vested in the President the authority to authorize a foreign government to construct and operate a radio station at the seat of government, where (1) he determines that the authorization is in the national interest of the U.S., and (2) where such foreign government has provided reciprocal privileges to the U.S. to construct and operate radio stations within territories subject to its jurisdiction. Under the President's Reorganization Plan No. 1 of 1977, this authority was delegated to the Secretary of Commerce by Executive Order 12046 of March 26, 1978.

2. The Secretary of Commerce has delegated this Presidential authority to the Assistant Secretary of Commerce for Communications and Information (Administrator, NTIA), by Department of Commerce Order 10-10 of May 9, 1978, which states in part, "... Authorization for the construction and operation of a radio station pursuant to this section and the assignment of a frequency for its use shall be made only upon recommendation of the Secretary of State and after consultation with the Attorney General and the Chairperson of the Federal Communications Commission."

3. Following the approval in principle by the Assistant Secretary of Commerce of the establishment of a radio station in Washington, D.C., by a particular foreign government, the Department of State will sponsor the necessary frequency applications in the Interdepartment Radio Advisory Committee (IRAC). IRAC shall review the applications and submit its

recommendations to NTIA. The IRAC will be provided with the instruments of authorization as approved by the Deputy Associate Administrator, Office of Spectrum Management, NTIA.

4. The technical conditions and the procedures for IRAC consideration of these applications are as follows:

a. The Department of State representative to IRAC will submit the applications to the Executive Secretary of the IRAC for technical consideration by IRAC's Frequency Assignment Subcommittee (FAS). Such application will indicate that the foreign administration involved has granted privileges to the U.S. For radio stations in the high frequency bands, antenna configuration and location, the hours of operation, and the name of the embassy will be included on the form. For radio stations operating as earth stations in the fixed-satellite service, the data specified in the applicable portion of Appendix 3 of the ITU Radio Regulations will be included as a minimum. However, when the earth station is proposed to operate in a band which is shared with terrestrial operations, the FAS shall not take action until the IRAC's Spectrum Planning Subcommittee (SPS) has indicated that coordination has been accomplished with the appropriate terrestrial operations.

b. For earth stations operating in a band which is shared with terrestrial operations, the Department of State IRAC representative will submit the data specified in the applicable portions of Appendix 3 of the ITU Radio Regulations to SPS for coordination with the appropriate terrestrial operations. Additionally, for earth stations in the fixed-satellite service, the proposed frequency usage shall be coordinated as required by 25.203 of the FCC Rules and Regulations. The results of that coordination together with the data and interference analysis will be included as part of the submission to the SPS.

c. Any embassy obtaining an authorization for an earth station operating in bands allocated for the fixed-satellite service must designate a representative to act in future coordination matters regarding terrestrial and satellite stations in the Washington, D.C. area.

d. A call sign or suitable designator will be furnished by the FCC.

e. Frequencies to be authorized shall be limited to

those in bands allocated in the U.S. to the fixed service or the fixed-satellite service, as appropriate.

f. The bandwidth of emission to be authorized will normally be limited to that associated with diplomatic communications.

g. The antenna to be authorized shall be limited to the minimum size and configuration that will support the diplomatic communications system.

h. Applications that clear the FAS shall be referred to the IRAC by the FAS with its recommendations. IRAC shall forward the applications together with its recommendations to NTIA. The Executive Secretary (IRAC) has discretionary power to act for IRAC except in the case of applications for new authorizations.

i. Approved assignments shall be recorded in the Government Master File of frequency assignments with an indication of (a) the embassy involved; (b) the fact that the assignment was made by the Assistant Secretary under Public Law 87-975; and (c) the fact that the Department of State is responsible for the assignment.

5. The following regulations have been established concerning the operation of these stations:

a. The characteristics of the transmitted signals and the conduct of the operation shall be such as to comply with the provisions of law and treaty that govern operation of other stations under the jurisdiction of the United States and with any other provisions that may be prescribed by the President.

b. The operation is subject to adjustment, including termination, in the event of harmful interference to other authorized operations having the right to protection.

c. The station will be operated upon reasonable request by the Department of State for the purpose of conducting brief technical monitoring observations.

d. In general, notification to the ITU of the authorized operation shall be effected by the United States.

8.2 FREQUENCY ASSIGNMENT PRINCIPLES

8.2.1 Frequency Sharing

Sharing of frequencies is necessary for the fullest utilization of the radio spectrum. This may entail the

acceptance of some interference but does not contemplate requiring the acceptance of harmful interference.

8.2.2 Planned Frequency Utilization

1. In the interest of planned and orderly utilization of the radio frequency spectrum, agencies are encouraged to inform the IRAC of planned frequency utilization.

2. This information normally should be furnished to the IRAC as a separate item of business. It may also be furnished to the IRAC or the FAS during the consideration of another agency's frequency assignment application when the proposed assignment has a bearing on the planned frequency utilization.

3. Whether such information will provide any prior rights for the operations concerned shall be determined by specific IRAC or FAS action on a case-by-case basis, taking into account all pertinent factors.

8.2.3 Consideration of Applications

Recognizing that the demand for radio frequencies greatly exceeds the supply, and to make the most efficient and orderly use of available frequencies in the national interest, frequency assignment action is predicated on consideration of all available data, including international regulations, national laws, established Government policies, national interest, availability of other possible communication facilities, and technical aspects.

8.2.4 Justification for Frequency Assignments

1. Applications for authority to use radio frequencies must be justifiable for reasons such as:

Specific presidential directive

Specific legislative directive

International commitments

To carry out the established mission of the applicant

2. Applications will indicate the purpose for which the frequency will be used, for example:

Broadcasting

Civil defense

Emergency communications (as when normal communication facilities are disrupted or are

inadequate as a result of hurricane, fire, flood, earthquake, or similar disaster affecting safety of life or property)

- Environmental data collection and dissemination
- Law enforcement
- Management and protection of federal property or personnel
- National defense
- National security
- Protection of national resources (for example, forests and waterways)
- Power transmission and distribution
- Research and experimentation
- Safety
- Space exploration

3. Description of the operation involved, and the specific objective to be satisfied, should be supplied in each instance, in sufficient detail to facilitate consideration of the application.

4. Where the application is for a new assignment, or for the modification of an existing assignment, the justification shall contain information concerning such of the below listed items as are pertinent, together with such other data as may be appropriate to substantiate the application:

- a. Name of project; if new, a brief description thereof.
- b. If the requested assignment is for use in a new circuit, net or system, or for a significant expansion of an existing system.
- c. If it is a replacement frequency.
- d. If the frequency applied for is already authorized the applicant, sufficient data concerning the existing authorization(s) to enable an assessment to be made of the expected effect of the requested assignment on the electromagnetic environment.
- e. If one or more basic characteristics are unusual for the frequency band or radio service specified, the reason therefor.
- f. If the application is for a multiple listing of a particular circuit or operation.
- g. The extent to which coordination has been achieved.

5. Applications for authority to use a radio frequency for a service which duplicates adequate existing facilities shall not be approved in other than exceptional cases.

8.2.5 Withholding Funds Pending Availability of Frequency Support

1. The obligation of funds by Government agencies for the development or procurement of communication-electronic equipments, requiring the assignment and protection of radio frequencies for their use, should be withheld pending assurance of the availability of appropriate frequency assignment support. Requirements for obtaining frequency support for telecommunications systems or major modifications of an existing system are under Chapter 10. This includes the selection, procurement, and development of earth or terrestrial station sites and facilities as indicated in Section 8.2.8. This is particularly important in the selection of sites and frequencies for earth and terrestrial stations to be operated in the co-equally shared bands as indicated in Section 8.2.33 (see Sections 8.3.12-8.3.15). In addition, in the case of a Government funded study, or a Government funded equipment procurement, by non-Government interests, wherein the use of radio frequencies is foreseen as a result of the study or procurement, the Government agency concerned should, as far as practicable, apprise the contractor(s)/grantee(s) of the need for ensuring that radio frequency support appears feasible. In this regard, it may be necessary for the Government agency, the non-Government entity, or both, to coordinate with the FCC.

2. This subject is covered in Section 12.4(e) of OMB Circular No. A-11, as follows: "Estimates for the development or procurement of major communication-electronics systems (including all systems employing space satellite techniques) will be submitted only after certification by the NTIA that the radio frequency required for such systems is available."

8.2.6 Programs to Determine How the Spectrum is Used

Frequency Assignment Review Program

1. Each Government agency shall maintain a program of continuing review of frequency assignments to its radio stations and shall delete or amend such assignments as appropriate. The objectives of this program are a) to ensure that

frequency assignments are in current use and are correctly reflected in the Government Master File (GMF), b) to ensure that frequency assignments are required for continued operations for the purpose stated in their justification, and c) to ensure that frequency assignments are still qualified for authorization under the provisions of the regulations contained in this Manual. Each assignment shall be reviewed 2 in the manner specified in Annex F, unless by the terms of its authorization it is subject to review more frequently.

Spectrum Measurement Program

2. A spectrum measurement program was established in October 1973 under which a van-mounted Radio Spectrum Measurement System (RSMS), operated by the Department of Commerce under the direction of NTIA, is used a) to determine whether radio installations operated by the Federal Government are utilizing authorized frequencies and are operating in accordance with applicable regulations, b) to provide information to help determine whether additional uses can be made in a particular band at a particular location, and c) to provide information to prevent or resolve cases of interference between two or more users.

3. The use of radio frequencies by Government agencies is subject to observation and measurement by the RSMS, in support of the spectrum management activities of NTIA. Notice of this was given to the applicable Government agencies in October 1973. Such agencies should ensure that their field personnel remain informed, as appropriate.

Spectrum Management Survey Program

4. A program to survey spectrum management activities within the Federal Government was established in February 1965. The objectives of this program are to determine at the operational level the degree of implementation of the applicable provisions of this Manual, whether frequency usage is in accordance with authorizations, and to exchange information with a view toward improving spectrum management in general. Surveys are conducted by NTIA personnel by means of on-site observation of communication-electronic facilities and discussions

with local frequency managers. Surveys are initiated through coordination with headquarters personnel, who are encouraged to participate in the surveys if possible.

Spectrum Resource Assessment Program

5. NTIA manages a program to assess spectrum use and to identify potential spectrum sharing problems within specific frequency bands allocated to the Federal Government. The objectives of this program include (1) the review and documentation of the characteristics and deployment of existing and proposed systems in specified bands, (2) the identification of potential band sharing problems which may impact on the efficient use of the spectrum, (3) the evaluation of any identified electromagnetic compatibility problems, and (4) the identification of alternative spectrum management approaches to resolving these problems. The sources of data used in completing these studies include the Government Master File, system data submitted in accordance with Chapter 10 of this Manual, data collected during the spectrum measurement and survey programs, as well as direct contact with the user agencies. These studies may be used in the development of spectrum policy, as background material for the systems review process (Chapter 10 of this Manual), and are available to the frequency managers of the various Federal agencies for planning purposes. Agencies are encouraged to cooperate and participate in the development of these spectrum resource assessments and make use of the spectrum resource assessment assistance which can be provided.

8.2.7 Notification of Discontinuance of Service

Assignment of a frequency to a particular station or class of station imposes upon the assignee the responsibility of duly notifying all interested agencies of proposed discontinuance of a station or a material change in character of service rendered, when other agencies are known to be dependent thereon or materially affected thereby.

8.2.8 Stations Located in Close Geographic Proximity

In general, the inherent right of the station first

established is recognized as regards a proposed new station whether transmitting or receiving. Nevertheless, for stations located in close geographic proximity and particularly in the case of installations involving very high effective radiated powers (50 kW or greater), digital system receivers having high carrier to noise ratio requirements or receivers intended for reception of very low level radiation (−100 dBW or less), engineering solutions may require the cooperation of all agencies involved in the application of reasonable and practicable measures within the state of the art to avoid causing or being susceptible to harmful interference.

8.2.9 Authorized Area of Operations of Mobile Stations

For an assignment to a land station and one or more mobile stations, the area described under receiver ANTENNA LOCATION for the reception of transmissions from the land station by the mobile stations shall be considered also as the area in which transmissions from the mobile stations, associated with the land station, are authorized.

8.2.10 Relative Priority of Frequency Assignments

1. Priority, unless specifically qualified, is the right to occupy a specific frequency for authorized uses, free of harmful interference from stations of other agencies.

2. The relative status between radio services and between frequency assignments with respect to their conformity to the Table of Frequency Allocations is indicated in Part 4.1.

3. Unless specifically agreed otherwise at the time a frequency assignment is made, the relative priority between two frequency assignments which are substantially equal is determined by their dates of assignment. The frequency assignment with the earlier date has priority over the frequency assignment with the later date.

4. If a temporary or trial assignment is renewed or converted to a regular assignment, the applicable date of assignment for priority purposes is the original date from which continuous authorization has been in effect. If the particulars of an existing assignment are

expanded (e.g., expansion of bandwidth, addition of new receiver antenna location, increase in power), but at a later date the assignment is changed back to the lesser particulars, the applicable date of assignment for priority purposes is the date on which the lesser particulars were first authorized.

5. The priority of a mobile station applies only in the geographical area designated in the particulars of the frequency assignment, as limited by the provisions of any limitation note which is part of the assignment.

6. The priority of a fixed station applies only at the geographical locality of the receiver antenna location designated in the frequency assignment, as limited by the provisions of any limitation note which is part of the assignment.

7. Priority notes shall not be applied to frequency assignments below 25000 kHz. Above 25000 kHz they shall be kept to a minimum.

8. Experimental classes of stations and classes of stations in support of experimental operations are on a secondary basis to stations of all other services.

9. Where, in adjacent Regions or sub-Regions, a band of frequencies is allocated to different services of the same category (i.e. both Primary or both Secondary), the basic principle is the equality of right to operate. Accordingly, the stations of each service in one Region or sub-Region must operate so as not to cause harmful interference to services in other Regions or sub-Regions.

8.2.11 Use of Radio Frequencies Below 30 MHz for Domestic Fixed Service

1. To insure that, insofar as practicable, sufficient high frequencies will be available for the operation of radio circuits essential to the national security and defense and to conserve frequencies below 30 MHz for services which cannot be operated adequately without them, only in the following circumstances shall departments and agencies of the Executive Branch of the Government use frequencies below 30 MHz for domestic fixed service¹ (within conterminous United States):

a. When it is indispensable to do so, and on the condition that the characteristics of the stations continue to conform to those in the United States list "Government Master File (GMF)," a land station may communicate, on a secondary basis, with fixed

stations or other land stations in the same category, using its assigned frequencies.

b. Where technical and operational requirements dictate, fixed stations may transmit to other fixed stations for the domestic haul of overseas traffic in transit, or destined for the United States. Such domestic radio haul shall be a segment of the overall overseas radio system. (These assignments will bear record note S208--see Annex A)

c. When there is a need to provide instantaneous transmission of vital emergency, operational command and alerting traffic of such importance as to affect the immediate survival and defense of the Nation. (These assignments are Category 1 assignments and will bear record note S148--see Annex A)

(1) Circuits in this category will be maintained in operational status at all times, with on-the-air test transmissions to insure the highest degree of readiness.

(2) Frequency assignments for such circuits shall be afforded protection commensurate with the importance of the communications for which the circuit is intended.

d. When required for use in an emergency jeopardizing life, public safety, or important property under conditions calling for immediate communication where other means of communication do not exist or are temporarily disrupted or inadequate. To insure that radio equipment for emergency use is maintained in satisfactory operating condition, testing on frequencies in this category is permitted, provided that insofar as practicable transmitters shall be tested with a non-radiating load and the test use of a radiating antenna held to a minimum and provided further that such testing shall be restricted to test message traffic and shall not include operator training. (These assignments are Category 2 assignments and will bear record note L012 or L113--see Annex A)

e. When there is a need to provide for a communications system manned by fully qualified operators who are military reservists or affiliates. Except in emergencies, frequency assignments in this category shall not be used as a means for passing traffic that in the absence of such assignments would require delivery by other means. (These assignments are Category 3 assignments and will bear record note S012--see Annex A)

f. When other telecommunication facilities do

not exist, are inadequate, or are impracticable of installation, and when the use of frequencies above 30 MHz is not practicable. (These assignments are Category 4 assignments and will bear record note S206--see Annex A)

g. In an emergency where it has not been feasible to make prior arrangements for alternate means of communications, it is permissible to operate temporarily on regularly assigned frequencies in a manner other than that specified in the terms of an existing assignment or on other appropriate frequencies under the following special circumstances:

(1) An emergency must actually exist or imminently threaten. An emergency for the purpose of this provision means a situation of temporary duration resulting directly or indirectly from a natural catastrophe or other occurrence which seriously affects the welfare of a community or of an area to the extent of endangering human life and property and in connection with which special communications facilities are required temporarily.

(2) Emergency operations shall be discontinued as soon as substantially normal communications facilities are restored.

2. With respect to subparagraphs 1c, 1d, 1e and 1f above, requests for the authorization of frequencies below 30 MHz for new systems, or in circumstances where the pressure on the radio spectrum would be increased materially, shall be referred by the Chairman, FAS to NTIA for review prior to assignment action. Approved assignments will be recorded in the GMF, and will bear record note C078 (see Annex A).

a. In compliance with the foregoing, the Chairman, FAS shall refer all applications that meet the following conditions:

(1) The frequency is below 30 MHz.

(2) The type of action is NEW, NOTIFICATION or MODIFICATION.

(3) The class of station is FX or AX.

(4) Record note S362 is not applicable.

(5) The transmitter and receiver ANTENNA LOCATIONS (XAL and RAL) are both located within the conterminous United States.

(6) The proposed frequency usage falls within category 1, 2, 3 or 4 above.

b. However, referral to NTIA is not required for the following exceptions:

(1) EXCEPTION 1--For a change in frequency of an existing station when an existing assignment for a frequency of the same general kilohertz order for that station is simultaneously deleted. (These assignments will bear Record note S358--see Annex A)

(2) EXCEPTION 2--For the addition of a new station to an existing domestic fixed circuit or network, provided the addition would not result in an extension of the hours of use of the frequency because of wave propagation. (These assignments will bear Record note S359--see Annex A)

(3) EXCEPTION 3--For the modification of an existing assignment, provided the modification would not increase materially the impact on the use of the radio spectrum below 30 MHz. (These assignments will bear Record note S360--see Annex A)

3. In order to establish adequate radio backup of wireline facilities in advance for use during an emergency, subparagraphs 1c and 1d above are interpreted to embrace the following elements:

- a. the predetermination of essential communication circuits which cannot tolerate disruption;
- b. the installation of the necessary equipment;
- c. the selection and assignment of frequencies to be employed on those circuits; and
- d. necessary testing.

8.2.12 Explanation of the Term "Tactical and Training"

1. The descriptive term "tactical and training" has been used for many years in connection with the assignment of radio frequencies and their operational use by units of the Army (the field Army), Navy (Fleet and Marine Forces), and Air Force (Tactical and Strategic Air Forces).

a. The term "tactical" emphasizes the aspect of mobility and flexibility required by such units as components of a military force whose operations (and tactics) are directed by the responsible military commander. Organizational equipment, including all communications-electronics (C-E) equipment, issued to such military units is designed specifically to meet their peculiar needs under combat conditions. Such C-E equipment includes that required to effect

communications internal to the particular unit and its components, as well as communication to the next higher/lower echelon of command and for other special-purpose C-E systems used for surveillance, weapons control, aeronautical and meteorological aids, etc.

b. "Training." In peacetime within the United States and Possessions, military operations are normally in connection with training and the obtaining of proficiency in all aspects of their ultimate employment as a military force in an emergency situation. The simulation of wartime operations in day-to-day use, field and fleet exercises and major maneuvers, is an essential requirement to assure immediate operational readiness.

2. The specific frequencies designated and authorized for military tactical and training purposes are primarily utilized as a group to meet the more essential needs, on a day-to-day basis, by operating forces throughout the United States and Possessions. Generally, all of these frequencies are assigned for use by major military commands. Where the source of frequencies is inadequate to meet special needs of these commands, e.g., in large exercises and major field and fleet maneuvers, they are supplemented by the use of frequencies in both Government and non-Government bands, subject to established procedures to insure the avoidance of harmful interference to the operations of the primary agencies and activities.

3. In addition to the principal use of such frequencies as set out in the preceding paragraphs, the following uses of a corollary nature, while not necessarily tactical and training, must be recognized where suitable frequencies such as those authorized for tactical and training purposes must be utilized:

a. In event of civil disturbances or other emergencies, military units may be required to assist in maintaining order and in safeguarding human life and property.

b. In the development, type acceptance, and compatibility testing or evaluation of C-E equipment intended for tactical purposes.

c. In effecting training of individuals and units at special service schools and test ranges.

d. In providing demonstrations of military weapons and C-E equipment at laboratories, proving grounds, and test ranges.

4. A further very important aspect which is

associated with these tactical and training frequencies, is the fact that this group of frequencies constitutes the limited base to support military needs under initial mobilization conditions. Experience gained from peacetime utilization of the specific frequencies designated and authorized for military tactical and training purposes materially enhances their value and usability in the event of a mobilization situation, particularly during the initial transition phase.

5. Certain military C-E equipment includes both portable and transportable types. In any operational situation it assumes a radio service classification in accordance with the nature of its actual operation. A portable or transportable station may at one moment be operating with a station in the fixed service; alternatively, when communication is involved with an aircraft or a ship, the station may be operating in the aeronautical or maritime mobile service.

8.2.13 Guidance on Use of Frequencies by Stations in Certain HF Bands

1. The Final Acts of WARC-79 reflect a number of allocation changes in the 3000-27500 kHz portion of the radio frequency spectrum. These changes reduce the amount of spectrum space allocated for the Fixed Services and increase the spectrum space for HF Broadcasting, Maritime Mobile, Amateur, and Radio Astronomy. The effective implementation dates for the expanded radio services will vary over a long period of time due to a complex reaccommodation process contained in Resolution 8 and the requirement for revision of entries in the Master International Frequency Register contained in Resolution 9. In addition specific actions must be taken at scheduled future ITU Conferences before exact implementation dates can be determined. The time frame for this transition will extend from early 1982 through 1990.

2. Government agencies, in the process of making new frequency assignments in the fixed service in the bands 9775-9900, 10100-10150, 11650-11700, 11975-12050, 12230-12330, 13360-13410, 13600-13800, 15450-15600, 16360-16460, 17360-17410, 17550-17700, 18068-18168, 18780-18900, 19680-19800, 21750-21850, 22720-22855, 24890-24990, 25110-25210, 25550-25600, in the Mobile except aeronautical mobile service in the bands 25110-25210, 25550-25600, or in the Broadcasting service in the band 25600-25670 kHz, shall to the maximum extent

feasible adhere to the following principles to assist in the timely implementation of the revised WARC-79 allocations:

a. New HF frequency assignments which require international protection and which are expected to be still required after the transition period should not be made in the bands which have been reallocated to exclude the radio service involved. This approach may preclude the necessity for reaccommodation later.

b. New frequency assignments which are required for a short period of time, not later than the transition period and which do not require international protection or pose an international interference potential should be confined to bands which are scheduled to be released to other radio services where possible. This approach will preserve the unallocated bands to meet long-term fixed requirements and those which require international protection. Applicants requesting assignments in the bands which are to be reallocated must fully accept the fact that all such assignments will be terminated by NTIA as soon as either national or international implementation plans and schedules require the particular band to be vacated.

c. All HF fixed assignments that are submitted to the I.F.R.B. during the period before the Final Acts of WARC-79 come into force will additionally include the information concerning the Class of Operation and the Regular Hours of Operations.

d. New HF fixed assignments in the bands which have been reallocated to exclude the fixed service shall not be notified to the I.F.R.B. unless it is a Class of Operation for which the Symbol A is appropriate or unless it is highly probable that it will cause harmful interference to stations of another administration.

8.2.14 Referral of Applications for Frequency Assignments in Bands Allocated to the Radio Astronomy Service

In the bands allocated to the radio astronomy service by the Government Table of Frequency Allocations, the FAS shall refer to the IRAC all applications for assignments that are not in accordance with that Table.

8.2.15 Referral of Applications Related to the Space Service

In the bands allocated to the space service by the Government Table of Frequency Allocations, the FAS shall refer to the IRAC all applications for assignments that are:

a. not in accordance with the Table except when the application is for:

- (1) the renewal of an existing assignment; or
- (2) test, and operation of electronic threat simulators during military tactical and training exercises; or

b. for experimental stations except when the application is for:

- (1) the renewal of an existing assignment; or
- (2) the static (ground-to-ground) test of a space system; or
- (3) experimentation that is consistent with the use for which the band is allocated.

8.2.16 Assigning the Most Heavily Occupied Frequency Channel

In order to have available the greatest possible spectrum support for future radiocommunication requirements, each new frequency assignment should be made in such a way that the increase in the total spectrum space committed is as small as possible. Accordingly, it shall be the normal practice, where feasible and consistent with frequency allocation and assignment plans, to assign the most heavily occupied frequency channel before resorting to those less heavily occupied.

8.2.17 Determining Whether a Station is a Government Station

1. The following guidelines are to assist in the determination of whether or not a station belongs to and is operated by the United States as specified in Section 305(a) of the Communications Act of 1934:

- a. The department or agency concerned should be able to exercise effective control over the radio equipment and its operation; and
- b. The department or agency concerned assumes responsibility for contractor compliance with Executive Branch, departmental, or agency

instructions and limitations regarding use of the equipment and ensures that such instructions and limitations are met when operating under the authority of an Executive Branch frequency authorization to the department or agency; and

c. The station should be operated by an employee of the department or agency or by a person who operates under the control of the department or agency on a contractual or cooperative agreement basis, and who is under supervision of the department or agency sufficient to ensure that Executive Branch, departmental, or agency instructions and limitations are met.

2. It is recognized that a Government agency may make a contract arrangement for maintenance or operation of a radio station under its control without diminishing the effective control of, or responsibility for, such station, provided the appropriate limitations or requirements are specified.

3. Since the foregoing may not cover every case, or where there may be doubt, the determination will be made by the department or agency concerned after consultation with the NTIA/ FCC as appropriate.

8.2.18 Assignment of a Band of Frequencies to a Station

When a band of frequencies is assigned to a station, e.g., 400-406 MHz, the necessary bandwidth of the station shall be so located within the band that it does not extend beyond the upper or lower limits of the band.

8.2.19 Limitation of Radiated Power

Government radio stations shall radiate only as much power as is necessary to ensure a satisfactory service.

8.2.20 Conversion of Fixed Stations to SSB Transmission

1. In the bands below 30 MHz, radiotelephone stations in the fixed service that use double sideband (DSB) transmission shall be converted by January 1, 1974 to single sideband (SSB) or independent sideband (ISB) transmission with suppressed or reduced carrier. Exceptionally, however, such stations

with mean power of less than 50 watts and those used for military tactical or training operations may continue to use double sideband transmission.

2. The FAS shall refer to the IRAC all applications for double sideband operations in the fixed service between 4000 and 27500 kHz with A3E emission and bandwidth of 6 kHz or more. However, exempt from referral are those applications involving average powers less than 50 watts, those for military tactical and training operations, and those where there is a statement on the applications to the effect that the applicant has a program for conversion to SSB within a reasonable period of time.

8.2.21 Use of Ionosphere Sounders

1. The use of ionosphere sounders for realtime selection of frequencies for operational communication circuits, realtime monitoring of upper atmosphere phenomena, and for the predicting of propagation conditions will be authorized only under the following conditions:

a. When it has been determined that no existing authorized ionosphere sounder transmitter is capable of meeting the requirement under a common user concept.

b. Operations shall be on a secondary basis to authorized radio services.

c. Transmissions in the bands 2495-2505, 4995-5005, 9995-10005, 13360-13410, 14990-15010, 19990-20010, 21850-21870, 24990-25010, 25550-25670 kHz and 38.00-38.25 MHz shall be avoided for sounders capable of frequency suppression.

d. Transmissions shall be swept or stepped through the operating range of the equipment at a rate or time interval expected to avoid harmful interference.

e. Transmitters shall be designed to eliminate emissions on any frequency channel where harmful interference is caused to authorized radio services.

2. Applications for frequency assignments to sounder network stations or sounder prediction stations shall include the following basic information in the SUPPLEMENTARY DETAILS (SUP) field:

a. Channeling plan(s) (required for all sounder network stations and, as applicable, for sounder prediction stations)²

b. Pulse duration(s)

c. Pulse repetition frequency(ies)

d. Pulse per channel

e. Scan rate(s)

f. Scan interval(s) (time between scans)

g. Antenna type(s)

h. Antenna azimuth

i. Antenna orientation(s) (If directional, indicate orientation of major lobe.)

3. All applications for sounders shall include a statement that the applicant has determined that no existing authorized ionosphere sounder transmitter is capable of meeting the requirement.

8.2.22 Use of Ionosphere Sounders for Purposes Other Than Those Mentioned in Section 8.2.21

The use of ionosphere sounders for purposes other than those mentioned in Section 8.2.21 shall be authorized only as experimental stations. The conditions to be applied shall be determined on a case-by-case basis.

8.2.23 Minimum Data Recommended for Inclusion on Applications for Antenna Testing Assignments Above 30 MHz

The following minimum data are recommended for inclusion, when applicable, on each application for frequency assignment for the testing of antennas above 30 MHz, in order to expedite action on the application and to enable present users of the frequencies to evaluate the potential interference.

1. Frequency and Transmission Data

a. Frequencies or Frequency Band Required

NOTE--The use of individual frequencies rather than a frequency band will greatly facilitate consideration of the request.

b. Transmission Characteristics

(1) transmitter output power

(2) effective radiated power (if ERP is unknown, give a reasonable estimate)

(3) types of emission

(4) bandwidth for each type of emission

2. Supporting Information

a. Name of geographical location and latitude and longitude of antenna site to the nearest second.

b. Test Environment

(1) profile of terrain-by description, maps and/or other means

(2) if tests are to be conducted within shielded enclosures, so state, and give the attenuation (in dB) of the enclosure

c. Antenna Configuration

(1) type of antenna

(2) whether full scale or less than full scale

(3) azimuth of the main lobe

(4) gain

(5) beam width in azimuth and elevation

(6) height above ground

(7) height above mean sea level

d. Period of Operation

(1) duration of requirement, including the dates it will be required.

(2) estimated hours of use, in local time; for example, 0800 to 1700 daily Monday through Friday; daytime only Monday through Friday.

3. *Justification*

a. Except in very extraordinary circumstances, applications should not be made for bands where regulations prohibit the granting of assignments, for example, the radio astronomy bands, the standard frequency bands, certain space bands. (See U.S. Table of Frequency Allocations.) If an assignment falling in a prohibited band is requested, a complete and adequate justification must be given as to why operation within the prohibited band is required.

b. The service should be specified for which the operational use of the antenna under test is intended, for example, radiolocation, radionavigation, fixed, space.

c. Unusual conditions should be justified, for example, high power for breakdown tests.

d. If the testing is being done under Government contract, the Government agency and contract number should be specified.

8.2.24 Use of Frequencies in the Bands Between 2850 and 22000 kHz Allocated Exclusively to the Aeronautical Mobile Service

1. The bands allocated exclusively to the aeronautical mobile service are subdivided into categories defined in Article 50 of the ITU Radio Regulations as follows:

a. Frequencies in any band allocated to the aeronautical mobile (R) service are reserved for communications related to safety and regularity of flight between any aircraft and those aeronautical stations primarily concerned with flight along national or international civil air routes.

b. Frequencies in any band allocated to the aeronautical mobile (OR) service are reserved for communications between any aircraft and aeronautical stations other than those primarily concerned with flight along national or international civil air routes.

2. National planning for the use of these bands is governed by the provisions of Article 50 of the ITU Radio Regulations and Appendices 26 and 27 Aer2 to those Regulations. These appendices allot specific (R) channels for use in particular areas, allot specific (OR) channels for use by particular countries, and set forth technical and operational principles governing this usage. The use of these bands by Government stations is subject to the normal procedures for coordination and assignment, except as provided by Sections 7.5.3 and 7.5.4, and, in addition, such use shall comply with the pertinent international regulations and plans mentioned above and more specifically referenced below.

Aeronautical Mobile (R) Bands

3. Frequency assignments to stations in the aeronautical mobile (R) service, in the bands allocated exclusively to that service between 2850 and 22000 kHz, shall be assigned in conformity with the provisions and the allotment plan of Appendix 27 Aer2 to the ITU Radio Regulations; it should be noted that Appendix 27 Aer2 completely replaces the provisions of Appendix 26 applicable to the Aeronautical Mobile (R) Service. Such assignments shall conform to the plan for the allotment of frequencies to (a) Major World Air Route Areas (MWARA's), (b) Regional and Domestic Air Route Areas (RDARA's), (c) VOLMET Allotment Areas, and (d) Worldwide Allotment Areas contained in Appendix 27 Aer2 or, to meet operational requirements not otherwise met by the Allotment Plan, comply with the provisions of Appendix 27 Aer2 for the adaptation of allotment procedures (27/21, 27/22 and 27/23). Assignments in support of International Air Routes (MWARA and VOLMET allotments) are also within the purview of applicable ICAO frequency

assignment plans that have been agreed internationally and are recognized in the ITU Radio Regulations.

4. Single sideband operations only are permitted in the bands allocated exclusively to the Aeronautical Mobile (R) Service in accordance with the provisions of Appendix 27 Aer2 and Resolution 402 of the Radio Regulations which contain, among others, the provision that the use of classes of emission H2B, J3E, J2B, J2D, and J9X only shall be authorized.

5. As a matter of general policy, high frequencies are not used for aeronautical mobile (R) communications in the domestic services within the conterminous United States, the need for such frequencies having been generally eliminated through successful use of VHF communications. However, Appendix 27 Aer2 provides for the allotment of frequencies to the RDARA's which include the conterminous United States (RDARA 11B), and also Alaska (10A), Hawaii (12A), and Puerto Rico and the Virgin Islands (12D). This then affords for special and certain related aeronautical communication requirements, not conforming fully to the definition of the Aeronautical Mobile (R) Service, to be satisfied by use of frequencies from these allotments within the limitations of the following national criteria established jointly with the FCC:

a. Communications related to safety and regularity of flight between and aircraft and those aeronautical stations primarily concerned with flight along national or international civil air routes shall have absolute priority over all other uses.

b. Use of (R) band high frequencies shall be limited to single sideband air/ground and incidental air/air communications beyond the range of VHF/UHF facilities.

c. Users shall share to the maximum extent possible.

d. Requirements shall be handled on a case-by-case basis.

e. A showing must be made that the accommodation of the requirements in the bands other than aeronautical mobile (R), e.g., fixed bands, is not satisfactory for technical, operational, or economic reasons.

f. Only those requirements will be considered where the primary need for communications is for the safety of the aircraft and its passengers or for operational control communications, i.e. "communications

required for exercising authority over initiation, continuation, diversion, or termination of a flight in accordance with the provisions of Annex 6" (ICAO).

g. Use of aeronautical mobile (R) high frequencies in accordance with the foregoing normally shall be limited to non-military.

h. If the aforementioned criteria are met, the stipulation that (R) bands are to be used only for flights along national and international civil air routes need not be met.

6. The following frequencies are available to all government users as frequencies that may be used for operational control and safety of civil government aircraft in the specified areas:

Assigned Frequency (kHz)	Carrier Reference Frequency (kHz)	Available Area
2897.4	2896	AK, HI, CONUS
2948.4	2947	AK, HI, CONUS
3002.4	3001	AK, HI, CONUS
6539.4	6538	CONUS Only
8886.4	8885	CONUS Only
8910.4	8909	AK, HI, CONUS
10055.4	10054	HI Only
11307.4	11306	CONUS Only
17950.4	17949	AK, HI, CONUS
21926.4	21925	AK, HI, CONUS
21929.4	21928	AK, HI, CONUS
21935.4	21934	AK, HI, CONUS

7. These frequencies are intended for users in support of operations not exclusively enroute in nature. These frequencies were chosen so as to avoid those channels which might result in harmful interference to aeronautical stations dedicated to the safety and regularity of flight. The use of these channels by U.S. Government stations with a maximum peak envelope power of 6 KW for Aeronautical terrestrial stations and 400 watts for aircraft stations is allowed under Provision 27/54 of Appendix 27 Aer2 of the Radio Regulations. (A list of additional frequencies available to designated agencies in specified areas is contained in the IRAC Supplement to this Manual.) It is assumed that the maximum peak envelope power specified above for aeronautical terrestrial stations will produce the mean effective radiated power of 1 KW used as a basis for the interference range contours.

8. Government aeronautical stations that operate in the aeronautical mobile (R) service within U.S. and

Possessions are normally authorized only for the Federal Aviation Administration. Non-Government stations in this service are authorized by the FCC. Coordination is accomplished as appropriate for assignments to these stations, and to those fulfilling the joint national criteria, through established IRAC/FCC procedures.

Aeronautical Mobile (OR) Bands

9. Frequencies in bands allocated exclusively to the (OR) service are internationally allocated to countries by Appendix 26 to the ITU Radio Regulations, which also establishes sharing criteria, protection ratios, and other technical and operational principles. These principles recognize the possible necessity for the adaptation of the allotment plan to meet valid requirements of the various administrations, provided these adaptations do not decrease the protection to frequencies assigned in strict adherence to the plan.

10. Frequencies in the bands allocated exclusively to the (OR) service are nationally used primarily for the satisfaction of military aeronautical requirements. Assignment of frequencies in these bands is subject to coordination with the Military Departments through the IRAC mechanism.

Channels Common to the Aeronautical Mobile (R) and (OR) Services

11. Section 7.5.3 authorizes aircraft, ships, and survival craft stations to use the channels common to the (R) and (OR) services, carrier (reference) frequencies 3023 and 5680 kHz, provided such use is in accordance with Nos. 2980 and 2984 of the ITU Radio Regulations, the appropriate provisions of Appendices 27 Aer2 thereto, and ITU Resolution No. 403. Section 7.5.4 authorizes additional uses by mobile stations engaged in coordinated search and rescue operations. Any use of these channels by land stations engaged in the coordination of search and rescue operations shall be in accordance with the same provisions, and shall be authorized by applications submitted and processed through normal assignment procedures.

8.2.25 Use of Frequency Diversity for LOS Transmissions in the Bands Allocated to the Fixed Service Above 1710 MHz

The necessity for employment of some form of diversity operation on selected LOS fixed radio-systems is recognized when such operation is required to provide acceptable levels of quality and reliability. However, in view of the growing demands on the frequency spectrum and the recognized effectiveness of space diversity techniques, the use of frequency diversity in the bands 1710-1850, 2200-2290, 4400-4990, 7125-7250, 7300-7975, and 8025-8400 MHz is limited as follows:

a. The use of frequency diversity for new Government LOS fixed radio systems shall be limited to those systems for which frequency diversity can be justified. Existing systems employing frequency diversity may continue until such time as frequency assignment congestion dictates the need for reevaluation.

b. The justification for the use of frequency diversity shall include a statement of the requirement for a high degree of systems reliability and another that an engineering evaluation has been made which demonstrates that the required reliability necessitates frequency diversity. The justification shall be submitted in accordance with the provisions of Section 9.8.2, paragraph 80e.

8.2.26 Use of Radio Frequencies to be in Accordance with ITU Provisions

Except as otherwise provided in this Manual or by the terms of a frequency authorization, present or future, the use of radio frequencies by Government radio stations within the US&P shall be in accordance with the provisions of the ITU Convention and Radio Regulations.

8.2.27 (Reserved)

8.2.28 Radiation Hazards

1. Personnel responsible for the operation of telecommunication equipment should be aware that exposure to high intensity levels of RF and other nonionizing electromagnetic energy presents potential health hazards. Actions should be taken, consistent

with existing safety guides and applicable official standards duly promulgated and prescribed by the Federal Government, to ensure that personnel are protected from such hazards. Although biological effects of electromagnetic radiation have been studied, current knowledge and understanding of these hazards is incomplete, particularly as regards possible hazards of prolonged exposure to microwave and lower frequency radiations at intensity levels below those shown to produce measurable heating. Research in this field is continuing.

2. At present, most safety guidelines and criteria are intended to protect against adverse aspects on body tissues that can occur when the rate of induced heating exceeds the organism's dissipative capacity. Previous studies of heating effects at sufficiently high energy levels (around and above 100 mW/cm²) led to the fairly general acceptance of 10 mW/cm² as a safe level below which such injury from heating would not be expected to occur. This value has thus been used as the basis for various safety criteria and standards, some of which are referenced.

a. References:

(1) Department of Labor Occupational Safety Standard for Nonionizing Radiation, Federal Register, Vol 37, October 18, 1972.

(2) Swanson, J. R., et al., "A Review of International Microwave Exposure Guides," American Industrial Hygiene Association Journal, September/October 1970, available from NTIS as PB195772.

(3) Glaser, Z., "Bibliography of Reported Biological Phenomena ("Effects") and Clinical Manifestations Attributed to Microwave and Radio Frequency Radiation," Naval Medical Research Institute, Research Report No. 2, Project MF12.524.015-0004B, October 1971, available from DDC as AD734391.

(4) Moore, W. Jr., "Biological Aspects of Microwave Radiation--A Review of Hazards," U.S. Department of Health, Education, and Welfare (DHEW), July 1968; TSB-68-4.

(5) Setter, L.R., et al., "An Annotated Bibliography of Regulations, Standards, and Guides for Microwaves, Ultraviolet Radiation, and Radiation from Lasers and Television Receivers," DHEW, PHS No. 999-RH-35, April 1969.

(6) "Laser/Maser Hazards," Air Force

Regulation No. 161-24, January 12, 1967.

(7) "Safe Laser Radiation Exposure Levels," letter from the Office of the Surgeon General, USAF, April 12, 1968.

(8) "Control of Microwave Health Hazard," Navy Bureau of Medicine and Surgery, Instruction 6470.13A, January 28, 1977.

(9) "Technical Manual for Radio Frequency Radiation Hazards," SEA OP-3565/AIR-16-1-529/E-LEX-67-LP-624-6010 (1981).

(10) "Control of Hazards to Health from Microwave Radiation," U.S. Army/Air Force, TB-med 270/AFM-161-7, December 1965.

b. One copy of each of the foregoing is maintained by the Executive Secretary of the IRAC for reference by Government services.

3. In the event that measurement capabilities are required to determine the nature of exposure or suspected hazards from nonionizing electromagnetic radiation, there are a number of agencies that have the necessary equipment and expertise. These capabilities are indicated in the document, "Nonionizing Radiation Measurement Capabilities State and Federal Agencies." U.S. Government establishments having a need for the capabilities described in this document should contact the cognizant organization. Whether such capabilities are made available is the prerogative of the agency contacted. This document is maintained by the Environmental Protection Agency (EPA). The point of contact at EPA is:

Chief, Electromagnetic Radiation Analysis
Branch

Environmental Protection Agency
Room 519B, Waterside Mall East
401 M Street, S.W.

Washington, D. C. 20460

Telephone: 202-755-1188 (or 301-427-7604 for the field laboratory in Silver Spring, Maryland)

8.2.29 Use of Frequencies by Stations in the Maritime Mobile Service

1. Stations in the maritime mobile service utilize bands allocated either exclusively to this service or on a shared basis with other services. Several international plans detail the specific uses of certain frequencies. The maritime mobile service is provided

with detailed operational and frequency regulations contained in the ITU Radio Regulations (RR). In addition, an abstracted manual which includes pertinent ITU Radio and Telegraph and Telephone Regulations entitled "Manual for Use by the Maritime Mobile Service," is issued by the ITU, and shall be carried by Government ships as required by and in accordance with regulations of the user agency (RR Appendix 11).

2. National planning for the use of the maritime mobile bands closely follows the international use. Exceptions are indicated in the National Table of Frequency Allocations (see Chapter 4) and as noted herein. For the bands 4-27.5 MHz, the assignable frequencies listed in RR Appendix 31 for each maritime mobile function are delineated in Annex H.

Maritime Mobile Telegraphy

3. Ship stations use working frequencies in the bands 415-490 kHz and 510-535 kHz, specified by RR 4237, for transmissions to coast stations. Coast stations transmit on other frequencies in these bands. Initial contact is usually established by calling on 500 kHz and shifting to appropriate working frequencies. Special provisions for morse telegraphy calling allow the use of 512 kHz when 500 kHz is being used for distress (RR 4239-4243). All ship stations equipped with NBDP to work in these bands shall be able to receive class F1B emissions on 518 kHz, if complying with the provisions of RR Chapter N IX (GMDSS). (See RR 4123U and 4315).

4. Frequencies in the bands between 4 and 27.5 MHz, allocated exclusively for this service, are used for several telegraphy modes. The frequency subbands available for assignment for each mode to coast and ship stations shall be as specified in RR 4195-4212A. Coast station frequencies for Maritime Safety Information (MSI) use are listed in Annex H (Table 11).

5. Several limitations apply to use of frequencies in the exclusive maritime mobile bands between 4 and 27.5 MHz:

a. Power limits for coast stations are:

(1) Single Channel A1A or F1B emissions (RR 4256 and 4321B):

Band (MHz)	Maximum Power (kW)	
	A1A (pX)	F1B (pY)
4	10	5
6	10	5
8	20	10
12	30	15
16	30	15
18	No A1A	15
22	30	15
25	No A1A	15

(2) Multichannel telegraphy (RR 4323BK):

2.5 kW (mean) per 500 Hz bandwidth

(3) For digital selective calling and acknowledgement, and for types of transmissions other than those indicated in (1) or (2) above, the maximum mean power shall not exceed the power specified for F1B emission in (1) above.

b. Power limits for ship stations:

Except for transmissions, in the exclusive maritime mobile bands between 4 and 27.5 MHz, of digital selective calls and acknowledgements, which are limited to a mean power of 1.5 kW, international radio regulations have no power limit for ship stations (MS) operating in the radiotelegraphy mode. The power used should be the minimum power, consistent with transmitter capability, necessary to provide satisfactory communications. The power listed in Annex H is not intended to serve as a power limit, but is a guide reflecting current practice.

c. RR Appendix 31 provides for ship and coast use in several functional allocations:

(1) *Wideband telegraphy, facsimile and special transmission systems*--Assignments to ship stations using wideband telegraphy, facsimile and special transmission systems may be adjusted to meet needs of systems using these bands provided they remain within the band limits (RR 4323BI). The shared use of certain of these ship station frequencies between Government and non-Government shall be in accordance with US296. See Annex H, Table 3 for frequencies available to ship stations and Annex H, Table 10 for frequencies available to coast stations.

(2) *A1A Morse calling*--See Annex H, Table 7 for frequencies available.

(3) *Oceanographic data transmission*--Use of these frequencies is limited to the transmission of oceanographic and meteorological data from ships and buoys. Oceanographic data interrogating stations may use these frequencies for interrogation of ships and buoys. The power of ship stations used for

oceanographic data transmission (Station Class OD), including buoys or other sensor platforms, is limited to 100 Watts. See Annex H, Table 4 for frequencies available.

(4) *Narrowband direct-printing telegraph and data transmission systems*--See Annex H, Tables 5 and 6 for frequencies available.

(a) *Narrowband direct-printing telegraph*--International technical standards for narrowband direct printing telegraphy systems are contained in RR Appendix 38 and shall be used nationally.

(b) *Data transmission systems*--Standards for data transmission systems have not been established by the ITU.

(5) *AIA Morse working*--See Annex H, Table 9 for frequencies available.

(6) *Digital selective calling*--See Annex H, Tables 8 and 11 for frequencies available.

Maritime Mobile Radiotelephony

6. Bands available to the maritime mobile service for radiotelephony are divided generally into exclusive maritime bands and bands shared with other services. The class of emission authorized in each band is described below. Where single sideband is specified, the authorized bandwidth is 2.8 kHz, upper sideband mode only is permitted, the assigned frequency must be 1.4 kHz above the carrier, and technical standards of RR Appendix 17 shall be followed. Where FM is specified, technical standards of RR Appendix 19 shall be followed. The principal bands within which maritime mobile radiotelephony may be authorized are:

a. 1605-3500 kHz--Portions of these bands are allocated to the Maritime Mobile Service exclusively, while other portions are shared with the fixed, mobile, and other services. Class J3E emission only may be authorized for U.S. ship and coast stations.

(1) Coast stations shall be limited to 5 kW PEP when located north of 32° N and 10 kW peak envelope power (PEP) when located south of 32° N.

(2) The use of J3E emission in U.S. waters is mandatory on carrier frequency 2182 kHz; however, H3E emission is also authorized for communications with foreign ship and coast stations (RR2973). Class A3E emission on this frequency is no longer authorized except for such apparatus (at ship stations)

provided solely for distress, urgency and safety purposes (RR 4127).

(3) Digital selective calling for distress and safety purposes shall be conducted on the frequency 2187.5 kHz. Digital selective calling for other than distress and safety purposes may be conducted on 2189.5 kHz (ship-to-shore) and 2177 kHz (ship-to-ship and shore-to-ship).

(4) Provisions for the use of the single sideband radiotelephone channels within the band 2170-2173.5 kHz and 2190.5-2194 kHz are:

(a) The assignable frequencies are 2171.9 and 2192.4 kHz.

(b) Emission is limited to J3E.

(c) Power is limited to 400 Watts PEP.

b. 4.0-23.0 MHz--Nationally and internationally only single sideband class J3E emission may be authorized. The PEP of ship stations shall not exceed 1.5 kW. The PEP of coast stations shall not exceed 10 kW. Within these limitations, frequencies in certain cases, are available to the maritime mobile service in exclusive bands for duplex and simplex use as set forth below:

(1) *Duplex*--Both ship station and coast station single sideband frequencies are designated in RR Appendix 16, Section A, on a paired basis, as shown in Annex H, Table 1. In addition, RR Appendix 25 provides an international frequency allotment plan by areas for use of those frequencies designated in Appendix 16, Section A. In general, while ships normally do not transmit on coast station frequencies in certain cases, Government ship stations are authorized to do so by Section 7.5.5. International notification of allocated channels are made in accordance with the provisions of ITU Appendix 25 and Article 16. National requirements developed in IRAC Documents 18380 and 25934 provided the basis for such notifications.

(2) *Simplex*--The frequencies of RR Appendix 16 (Section B) as shown in Annex H, Table 2 may be authorized for use on a simplex basis by coast and ship stations. Additionally, the assigned frequencies 4126.4, 4418.4 and 6517.4 kHz also may be so authorized. The use of 6517.4 kHz for this purpose should be limited to day-time operation. Simplex frequencies may be authorized for both ship/coast stations and intership communications. Intership operations may be on two frequencies if they are cross

banded. Power for these simplex frequencies shall not exceed 1 kW peak, and emission is limited to class J3E. These frequencies are shared equally on a non-priority basis by both Government and non-Government coast and ship stations in a manner consistent with the provisions of US82.

c. *156-162 MHz*--Within these limits, the band is divided into numbered channels which are listed in RR Appendix 18, along with recommended use. Assignments not in accordance with Appendix 18 are subject to adjustment to other frequencies in this band as long term U.S. maritime VHF planning develops.

(1) The band 157.0375-157.1875 MHz is allocated to the Government for maritime mobile operations. The band is divided into six channels. Two of these channels have a specialized use associated with non-Government maritime mobile operations. Channel 22, 157.1 MHz, is the primary frequency for Government and non-Government liaison communications with the Coast Guard. Channel 81, 157.075 MHz, is primarily for environmental protection operations as outlined in Section 7.5.6.

(2) The remainder of the VHF channels in the band 156-162 MHz are allocated to the non-Government; however, channels are available to the Government as outlined below:

(a) Channels 12 and 14, 156.6, 156.7 MHz, and the Channel 20 duplex pair, 157.0 and 161.6 MHz, may be authorized for port operations. Record note L283 applies for coast stations.

(b) Channel 6, 156.3 MHz, may be authorized for intership operations. It is already authorized for coordinated operations at the scene of a SAR incident as outlined in Section 7.5.4. Record Note S063 applies. Coast stations may use 156.3 MHz for exchange of traffic dealing with safety of life or property when other means of communication are not practicable. Record Note L330 applies.

(c) Channels 12, 14, 11 and 13, 156.6, 156.7, 156.55 and 156.65 MHz in priority order, may after coordination with the FCC, be authorized for Vessel Traffic System (VTS) operation.

(d) Channel 13, 156.65 MHz, may be authorized for bridge-to-bridge operations according to provisions set forth hereafter.

(e) Channel 16, 156.8 MHz, is designated nationally and internationally for distress, safety and calling. Government ship and coast stations, during

their hours of service of VHF radiotelephony, shall maintain a watch for reception of 156.8 MHz whenever practicable. Government ships transiting portions of the St. Lawrence Seaway or a Coast Guard operated VTS may terminate the listening watch on 156.8 MHz when directed by the Seaway or VTS authorities to call and work on a designated ship movement frequency. Assignments on 156.8 MHz shall include Record Note S035.

(f) For public correspondence purposes ship stations are authorized to communicate with public correspondence coast stations. In these instances, the ship station shall transmit on the designated ship frequency appropriate to the public correspondence channel assigned to the coast station. Assignments for such use shall include Record Note L197. The specific receiving coast station shall be listed in Receiver Antenna Location field; however, if there are more than three receiver locations, list the area in which the receiving stations are located.

(g) Other authorized use of frequencies by mobile stations to communicate with non-Government stations is contained in Section 7.5.2. Record Note S165 applies.

(3) Port operations channels may be used in lock and waterway operations in addition to operations at or near ports.

(4) Stations on board aircraft may communicate with stations of the maritime mobile service. The communications of an aircraft station shall be brief and limited to operations in which maritime mobile stations are primarily involved, and where direct communications between aircraft and the ship or coast station is required.

(a) The mean power of aircraft stations shall not exceed five Watts, however, a power of one Watt or less shall be used to the maximum extent possible.

(b) While using the frequency band the altitude of aircraft stations should not exceed 305 meters (1000 feet) except for reconnaissance aircraft participating in ice-breaking operations where an altitude of 457 meters (1500 feet) is allowed. The frequencies 156.3 and 156.8 MHz may be used by aircraft stations for safety purposes only.

(5) Stations operating in the maritime mobile service in the band 156-162 MHz are subject to the technical standards and power limitations of Section 5.5.2.

(6) Stations on board government vehicles used for towing trailered boats engaged in SAR operations, or SAR training exercises, are authorized to operate on VHF FM maritime mobile frequencies with stations in the maritime mobile service. Such stations are subject to the technical standards and power limitations applicable to the maritime mobile service.

**Bridge-to-Bridge Communications and
Navigational Communications on
156.65 MHz or 156.375 MHz**

7. *General.* Public Law 92-63 (33 USCA, Sections 1201-1208), the Vessel Bridge-to-Bridge Radiotelephone Act, provides the statutory basis for the national designation of “a specific frequency or frequencies dedicated to the exchange of navigational information on navigable waters of the United States”.

a. The primary purpose of the act, and for the designation of a navigational communications frequency pursuant thereto, is to “provide a positive means whereby the operators of approaching vessels can communicate their intentions to one another through voice radio . . .” Thus, the primary use of the designated navigational communications frequency provided for by the act is ship-to-ship. However, it is clear from the act's regulatory history that limited use of this frequency by certain shore stations would be “clearly in the interest of navigational safety” and, therefore, permissible.³

b. The act applies to both U.S. Government vessels and non-Government vessels and, for obvious reasons, effective implementation requires that all vessels subject to its provisions operate under compatible requirements. The FCC has promulgated, in Part 80 of its Rules, regulations governing non-Government vessels subject to the act. The regulations herein, effective for all U.S. Government vessels subject to the Act, are fully compatible with the FCC regulations.⁴

c. *The Navigational Communications Frequencies.* Pursuant to Section 2 of the aforementioned Act, and except for a limited area of the Southern Louisiana section of the Mississippi River System, the frequency 156.65 MHz, 16K0F3E emission, has been designated as the national “navigational communications frequency.” The frequency 156.375

MHz has been designated as the “navigational communications frequency” in the lower Mississippi River. For the purpose of these regulations “navigational communications” are those communications between ship stations, or between coast stations and ship stations, in which messages are restricted to those relating to the maneuvering and the safety of ships and, in emergency, to the safety of persons.

d. *Use of 156.65 or 156.375 MHz for Navigational Communications.* The frequency 156.65 or 156.375 MHz, 16K0F3E emission, is available for assignment to:

(1) Bridge-to-bridge stations aboard Government vessels subject to the provisions of the Vessel Bridge-to-Bridge Radiotelephone Act for use in conformity with the purpose of the Act and the definition of such stations in Section 6.1.3 of this Manual,⁵ and

(2) Government coast stations for navigational communications with vessels.

e. Use of the frequency 156.65 or 156.375 MHz by any Government station shall be limited exclusively to navigational communications as defined herein or for necessary tests.

f. Since the navigational communication frequency necessarily will be shared by a large number of users, and in recognition of the safety of life aspect inherent in the operations involved, it is essential that the communication range of all stations using this frequency be restricted. Unless specifically authorized otherwise, a mean power not to exceed one watt shall normally be used. A maximum power of 25 watts for vessels and 10 watts for shore stations may be used in exceptional cases when communications cannot be established using one watt. Antenna height and gain limitations are under consideration; in the interim, heights should be limited to the minimum required for reliable communications over the distance involved.

g. Transmissions on the frequency 156.65 or 156.375 MHz shall be identified by the name of the vessel, or the facility in the case of a coast station, in lieu of a call sign.

h. All Government use of 156.65 or 156.375 MHz is subject to the technical standards in Chapter 5 of this Manual. Vessel bridge-to-bridge radiotelephone installations are, additionally, subject to the requirements of the following paragraphs.

i. *Vessel Bridge-to-Bridge Radiotelephone*

Installation. Section 2 of the Act states that the purpose is “to provide a positive means whereby the operators of approaching vessels can communicate their intentions to one another through voice radio. . . .” Thus, the Act clearly imposes a total system communications requirement which, necessarily, involves both transmitting and receiving capabilities, on all vessels subject to the Act.

j. It is considered that the basic operational objectives of the Act will be met by transmitting and receiving installations having the following minimum performance characteristics:

(1) *Vessel transmitters*--For navigational communications, transmitters should be capable of effective transmission of 16K0F3E emissions with at least 8 watts mean power into 50 ohms effective resistance in the case of non-portable transmitters and at least 0.75 watt in the case of portable transmitters. Each nonportable transmitter, and each portable transmitter of more than one watt, shall have provisions for readily reducing the power to a value not less than 0.75 watt and not more than one watt. After January 21, 1997, non-portable transmitters must automatically reduce the carrier power to one watt or less when tuned to the frequency 156.375 MHz or 156.650 MHz. A manual override device must be provided which when held by the operator will permit full carrier power operation on these channels. Transmitters should be adjusted so that the transmission of speech normally produces peak modulation within the limits 75-100%. (Note: Other applicable standards are in Chapter 5.)

(2) *Vessel receivers*--Receivers should be capable of effective reception of 16K0F3E emission on navigational communication frequencies and should comply with the following characteristics:

(a) Frequency stability within 0.001%.

(b) Usable sensitivity of 0.5 microvolt, maximum, for nonportable receivers and 1.0 microvolt, maximum, for portable receivers.

(c) Adjacent channel selectivity and desensitization of 70 dB, minimum, for non-portable receivers and 40 dB, minimum, for portable receivers.

(d) Modulation acceptance bandwidth of ± 7 kHz, minimum.

(e) Spurious response attenuation of 85 dB, minimum, for nonportable receivers and 50 dB, minimum, for portable receivers.

(3) *Vessel Antenna*--Antennas should be as nondirectional (horizontally) and as efficient as is practicable for the reception of ground waves at 156.65 MHz.

(4) *Channel 22A Requirement*--The radiotelephone installation required by this section must also be capable of transmitting and receiving on channel 22A (157.1 MHz).

(5) *Channel 67 Requirement*--While transiting any of the following waters, vessels subject to the Act also must have on board a radiotelephone capable of transmitting and receiving on channel 67 (156.375 MHz):

(a) The lower Mississippi River from the territorial sea boundary, and within either the Southwest Pass safety fairway or the South Pass safety fairway specified in 33 CFT 166.200, to mile 242.4 AHP (Above Head of Passes) near Baton Rouge,

(b) The Mississippi River-Gulf Outlet from the territorial sea boundary, and with the Mississippi River-Gulf Outlet safety fairway specified in 33 CFR 166.200, to that channel's junction with the Inner Harbor Navigation Canal; and,

(c) The full length of the Inner Harbor Navigation Canal from its junction with the Mississippi River to that canal's entry to Lake Pontchartrain at the New Seabrook vehicular bridge.

k. For operating regulations, maintenance requirements, and limitations on use of the bridge-to-bridge radiotelephone installation, see Title 33 CFR, Chapter 1, Part 26.

1. *Exemptions of Vessels from Requirements of the Act.* Applications for the exemption of vessels from the provisions of the Vessel Bridge-to-Bridge Radiotelephone Act should be forwarded directly to the Commandant, U.S. Coast Guard.

Bridge-To-Bridge Communications for Vessels Navigating On The Great Lakes

8. *General.* Each Government vessel navigating on the waters under the navigational rules for the Great Lakes and their connecting and tributary waters and to which the Vessel Bridge-to-Bridge Radiotelephone Act (33 USCA, Sections 1201-1208) applies, is exempt from the regulations of the act under Sections 26.03, 26.04, 26.05, 26.06, and 26.07 of Title 33,

Code of Federal Regulations, Part 26. These exempted sections comprise those regulations pertaining to the type of radiotelephone required; the use of the designated frequency 156.65 MHz; the use, maintenance, and failure of the radiotelephone; and the use of the English language. Sections 26.01, 26.02, 26.08, 26.09 (a), and 26.10 of Title 33 CFR remain in effect. These sections deal with the purpose of the act, definitions, exemption procedures, and penalties.

9. Each of these vessels must comply with the appropriate provisions of "The Agreement between the United States and Canada for Promotion of Safety on the Great Lakes by means of Radio, 1973", outlined in the following paragraphs, that provide for a bridge-to-bridge communications capability considered to be in constructive compliance with the Vessel Bridge-to-Bridge Radiotelephone Act.⁶

10. *Radiotelephone Installation.* Each Government vessel shall be fitted with radiotelephone installations that are capable of effectively transmitting and receiving G3E emissions on at least the following VHF channels:

Channel 16--156.8 MHz (Distress, safety and calling)

Channel 6--156.3 MHz (Primary intership)

Channel 13--156.65 MHz (Navigational bridge-to-bridge)

Channel 12--156.6 MHz

Channel 14--156.7 MHz

a. Additionally, such other frequencies as required for the vessel's service and to include the capability to receive VHF-FM marine navigation warnings for the area of operation.

b. The radiotelephone station, exclusive of the antennas and source of electric energy, shall be located as high as practicable on the vessel, preferably on the bridge.

c. The principal operating position of the radiotelephone installation shall be on the bridge, convenient to the conning position.

d. Where the radiotelephone station is located elsewhere than on the bridge, provision shall be made for complete operational control of the equipment at that location and at the bridge operating position. However, provision shall be made to take immediate and complete control of the equipment at the bridge operating position.

e. Provision shall be made for illuminating the

operating controls at the principal operating position.

f. Means shall be provided for charging any storage battery used in connection with the radiotelephone station.

g. The radiotelephone transmitter shall be capable of delivering at least 10 Watts carrier power to the antenna. Provision shall be made to reduce this power readily to one Watt.

h. The radiotelephone receiver shall have a sensitivity of at least two microvolts across 50 ohm or equivalent input terminals, for a 20 decibel signal-to-noise ratio.

i. The associated antennas shall be effective, vertically polarized, and located as high as practicable on the masts or superstructure of the vessel. The transmission line shall be effective and, to the extent practicable, shall impose a minimum loss.

j. The radiotelephone installation is subject to the technical standards in Chapter 5 of this Manual.

11. *Vessel Bridge-to-Bridge Watch.* Each Government vessel shall, when underway, maintain a continuous and effective watch on channel 13 (156.65 MHz). Vessels are exempt from this requirement while transiting the St. Lawrence Seaway and complying with the Joint Regulations of the St. Lawrence Seaway Authority and the Saint Lawrence Seaway Development Corporation between the lower exit of St. Lambert Lock at Montreal and Crossover Island, New York, and in the Welland Canal and approaches between calling-in points No. 15 and No. 16.

a. Sequential monitoring techniques alone are not sufficient to meet this requirement.

b. Portable VHF equipment may be used to meet this requirement.

c. This watch shall be maintained by the master, or person designated by the master, who may perform other duties provided they do not interfere with the effectiveness of the watch.

12. The UHF frequencies and technical standards for on-board communication stations as provided by RR 670 and Appendix 20, respectively are:

a. The preferred two simplex (duplex) frequencies for use in the territorial waters of the United States and Canada for on-board communications are paired as follows:

On-Board Communications

On-Board Repeater (Transmit) (MHz)	On-Board Mobile (Transmit) (MHz)
457.525	467.750
457.550	467.775
457.575	467.800
457.600	467.825

Use of these frequencies by Government stations is subject to agreement with the FCC in the IRAC/FCC mechanism.

b. Technical characteristics:

(1) Effective radiated power not to exceed 2 Watts. Whenever practicable the equipment should include a device to readily reduce the power by at least 10 dB.

(2) In the case of equipment installed at a fixed point on the ship, the height of antenna shall not be more than 3.5 meters (approximately 10 feet) above the highest working deck.

(3) Only FM with a pre-emphasis of 6 dB/octave (phase modulation) shall be used.

(4) Deviation not to exceed ± 5 kHz.

(5) Tolerance shall be 5 parts in 10.

(6) The audio-frequency band shall be limited to 3000 Hz.

8.2.30 Procedure in a Case of Harmful Interference

1. In the use of the radio frequency spectrum, interference must be expected; however, the acceptance of harmful interference is not contemplated.

2. Harmful interference is "Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations." (RR)

3. When harmful interference is received, the following actions should be taken in the absence of agency instructions to the contrary:

a. Determine the source, if possible. Within the United States the FCC district offices and monitoring stations can assist in determining the source of harmful interference and may be contacted directly for such assistance.

b. If the source is identified, try to eliminate the

harmful interference by dealing directly with individuals located at the source.

c. If direct action is impracticable or unsuccessful, report the circumstances to the frequency management authority of your agency.

4. In taking any of these actions, provide all possible information concerning the interference. An interference report should include as much of the following as practicable:

a. Particulars concerning the station causing the interference:

- (1) Name or call sign
- (2) Frequency measured
- (3) Class of emission
- (4) Bandwidth
- (5) Station class
- (6) Bearing
- (7) Nature of interference

b. Particulars concerning the transmitting station whose transmissions are being interfered with:

- (1) Name or call sign
- (2) Frequency assigned
- (3) Frequency measured
- (4) Class of emission
- (5) Bandwidth
- (6) Station class
- (7) Geographic location

c. Particulars furnished by the receiving station experiencing the interference:

- (1) Name or call sign
- (2) Station class
- (3) Geographic location
- (4) Dates and times of occurrence of harmful interference

d. Other supporting data:

- (1) Reporting agency
- (2) Canadian coordination data
- (3) Other information

5. Within the U.S./Mexican border area, some intermittent interference can be expected. When harmful interference from a Mexican station is severe enough to interrupt a U.S. radiocommunications service and relief from Mexico is desired, an interference report in the prescribed format (see the following "Initial Report of Radio Interference to U.S. Stations from Mexico") and any comments which deemed pertinent for resolution of the harmful interference must be

forwarded to the local FCC Field Office Engineer-in-Charge.

Copies of this report must be forwarded to your agency IRAC/FAS representative and to the FAS Secretary at NTIA at the following address to assist in the resolution of the interference:

U.S. Department of Commerce
NTIA/FA&IASD
ATTN: FAS Secretary
Room 1605, Herbert C. Hoover Bldg.
14th & Constitution Avenue, N.W.
Washington, D.C. 20230

6. In the event the harmful interference cannot be resolved satisfactorily at the agency level, the matter may be referred to the IRAC or the NTIA, as appropriate, for assistance.

INITIAL REPORT OF RADIO INTERFERENCE TO U.S. STATIONS FROM MEXICO

(When Federal Agencies are receiving harmful interference from Mexican stations, this format may be completed and provided to the Federal Communications Commission (FCC) to assist in the resolution of the problem.)

1. COMPLAINANT DATA:

DEPARTMENT/BUREAU: _____

NAME: _____

FACILITY: _____

ADDRESS: _____

TELEPHONE NO.: _____

APPROXIMATE DISTANCE FROM YOUR STATION TO THE US/MEXICAN BORDER: _____

2. PARTICULARS REGARDING STATION EXPERIENCING THE INTERFERENCE:

A. NAME/CALL SIGN/STN ID: _____

B. FREQ(s) RECEIVING INTERFERENCE: _____

C. GOVERNMENT MASTER FILE (GMF) AGENCY SERIAL NO.(s): _____

D. STATION CLASS(es)/EMISSION DESIGNATOR(s): _____

E. GEOGRAPHIC LOCATION AND ELEVATION OF RECEIVER:

STATE/COUNTRY (RSC): _____

ANTENNA LOC'N (RAL): _____

LATITUDE (RLA): _____

LONGITUDE (RLG): _____

ANTENNA DIMENSIONS (RAD): _____

IS TONE SQUELCH OR DIGITAL SQUELCH USED ON VICTIMS RECEIVER? _____

F. DATE, TIME INTERFERENCE STARTED: _____

G. DATE, TIME INTERFERENCE MOST DISRUPTIVE: _____

H. DATE, TIME INTERFERENCE ENDED: _____

I. DESCRIPTION OF HARM CAUSED BY INTERFERENCE:

_____ HARMFUL TO SAFETY OF LIFE?

OR

_____ NON-SAFETY? (Obstructs Communications in Progress)

J. DESCRIPTION OF INTERFERING SOURCE (Provide as much detail as possible, e.g., recordings, etc.):

K. DESCRIPTION OF HOW INTERFERENCE DISRUPTS YOUR ACTIVITY:

(Local Reproduction as Necessary)

8.2.31 Conversion of Stations in the Aeronautical Mobile Service to SSB or ISB Transmission

In the bands below 30 MHz, equipment procured for the aeronautical mobile service shall be capable of single sideband or independent sideband emission with suppressed or reduced carrier. In the case of stations in the aeronautical mobile (R) service, the use of single sideband shall be determined by the international requirements pertaining to that service.

8.2.32 Control of Emissions from Space Stations

To permit satisfaction of the maximum number of frequency requirements, assignments must be capable of time-sharing to the extent practicable to preclude mutual, harmful interference. Therefore, the use of frequencies by space stations will be authorized only in those cases where such stations are equipped so as to ensure the ability to turn on or to provide immediate cessation of emissions by telecommand.

8.2.33 Selection of Sites and Frequencies for Earth and Terrestrial Stations in the Bands Above 1 GHz Shared with Equal Rights by Terrestrial Radiocommunication and Space Radiocommunication Services

Sites and frequencies for earth and terrestrial stations, to be operated in frequency bands above 1 GHz which are shared with communication services, shall be selected to the extent practicable in areas where the surrounding terrain and existing frequency usage are such as to minimize the possibility of harmful interference between the sharing services.

8.2.34 Power and Direction of Maximum Radiation of Stations in the Fixed or Mobile Service in Certain Bands Shared with Stations in the Space Radiocommunication Services (Earth-to-Space) on an Equal Rights Basis

1. In the band 1427-1429 MHz as far as practicable, sites for transmitting stations in the fixed or mobile services, employing values of e.i.r.p. exceeding +35 dBW should be selected so that the direction of

maximum radiation of the antenna will be at least 2 degrees away from the geostationary-satellite orbit, taking into account the effect of atmospheric refraction.

2. In the bands between 8025 and 8400 MHz, the power delivered by a transmitter to the antenna of a station in the fixed service shall not exceed +13 dBW. The maximum equivalent isotopically radiated power (e.i.r.p.) of a station in the fixed or mobile service shall not exceed +55 dBW.

3. As far as practicable, sites for transmitting stations, in the fixed service, employing maximum values of e.i.r.p. exceeding +35 dBW in the frequency bands between 8025 and 8400 MHz, shall be selected so that the direction of maximum radiation of any antenna will be at least 2° away from the geostationary satellite orbit, taking into account the effect of atmospheric refraction. Where this is impractical, maximum e.i.r.p. of a station in the fixed or mobile service shall not exceed +47 dBW in any direction within 0.5° of the geostationary satellite orbit; or

+47 dBW to +55 dBW, on a linear decibel scale (8 dB per degree), between 0.5° and 1.5° of the geostationary satellite orbit, taking into account the effect of atmospheric refraction.

4. The following applies to fixed systems in the 14.5-14.7145 GHz frequency band and mobile systems in the 14.7145-14.8 GHz frequency range. The power delivered by a transmitter to the antenna shall not exceed +10 dBW and the e.i.r.p. shall not exceed +55 dBW. As far as practicable, sites for transmitting⁷ stations, in the fixed or mobile service, employing maximum values of e.i.r.p. exceeding +45 dBW should be selected so that the direction of maximum radiation of any antenna will be at least 1.5° away from the geostationary satellite orbit, taking into account the effect of atmospheric refraction.

5. A computer program is available in the NTIA for checking compliance of fixed stations with the foregoing provisions. One version of this program is used in checking frequency assignment applications. A separate version is used in support of the SPS in the system review process (see Chapter 10) and will be used by the NTIA upon request from agencies not having direct access to the NTIA computer. To provide more general assistance to agencies in the earlier stages of planning of fixed and mobile systems

for operation in these bands, a table is provided in Annex B which identifies transmitter pointing angles that should be avoided under certain postulated conditions.

8.2.35 Power and Direction of Maximum Radiation of Earth Stations in Certain Bands Shared with Stations in the Fixed or Mobile Service

1. In the bands 7900-8400 MHz, the equivalent isotopically radiated power (e.i.r.p.) of earth stations in any direction towards the horizon shall not exceed the following limits:

- + 40 dBW in any 4 kHz band for $\theta^8 \leq 0^\circ$
- + 40 + 3 θ dBW in any 4 kHz band for $0^\circ < \theta \leq 5^\circ$

2. For angles of elevation of the horizon above 5° , there is no limit as to the e.i.r.p. transmitted by earth stations towards the horizon.

3. Earth station antennas for services, other than the space research service, shall not be employed at elevation angles of less than 3° measured from the horizontal plane to the direction of maximum radiation.

4. Earth station antennas for the space research service shall not be employed at elevation angles measured from the horizontal plane to the direction of maximum radiation of less than 5° for the near-earth operations nor less than 10° for deep space operations.

5. Evaluation of earth stations for compliance with the provisions of this section should be accomplished prior to or at the time of the systems review under Chapter 10. An algorithm to perform this evaluation is contained in Annex B, together with an illustrative check of a system.

(1) the frequency bands allocated to the space research service, including bands allocated for active sensors carried by space research spacecraft;

(2) the frequency bands allocated to the space operation service, the earth exploration-satellite service using active sensors, and the radiolocation service using stations on spaceborne platforms, which are required for the support of space research, as well as for radiocommunications and space research transmissions within the lunar shielded zone.

a. The shielded zone of the Moon comprises the area of the Moon's surface and an adjacent volume of space which are shielded from emissions originating

within a distance of 100,000 km from the center of the Earth. The level of harmful interference is determined by agreement between the administrations concerned, with the guidance of the relevant ITU-R Recommendations.

b. In frequency bands in which emissions are not prohibited by a. above, radio astronomy observations and passive space research in the shielded zone of the Moon may be protected from harmful interference by agreement between administrations concerned.

c. Sections a. and b. do not apply to existing or future radio transmitters which operate at a distance less than 100,000 km from the center of the Earth.

d. Radio astronomy observation and passive space research users are urged to take all practical steps in the design and location of their equipment in the shielded zone of the Moon to reduce the effects of harmful interference from, and to maximize the electromagnetic isolation between, such equipment and emissions which may originate at distances of greater than 100,000 km from the center of the earth.

e. The IRAC shall be informed of plans for radio astronomy/passive space research observations in the shielded zone of the Moon in order to facilitate frequency coordination between such devices and transmitters which may operate at distances greater than 100,000 km from the center of the Earth.

6. Earth Station Off-axis Power Limitations

The level of equivalent isotopically radiated power (e.i.r.p.) emitted by the earth station at angles in the direction the geostationary satellite orbit off the main-beam axis has a significant impact of interference caused to other geostationary satellite networks. Enhanced utilization of the geostationary satellite orbit and easier coordination would be attained by minimizing such off-axis radiation and administrations are encouraged to achieve the lowest value practicable bearing in mind the latest ITU-R Recommendations. Minimizing such levels is particularly important in intensively used uplink bands.

8.2.36 Power Flux Density Limits⁹

1. Limits at the Earth's Surface from Space Stations⁹

a. The power flux density and receiver input power limits at the Earth's surface, specified in the table below, shall apply to space stations operating in

the bands and for the services indicated in the table.

b. Evaluation of space stations for compliance with the provisions of this section should be accomplished prior to or at the time of systems review under Chapter 10. A procedure is provided in Annex B for checking the compliance of space stations in the geostationary orbit with the power flux density limits applicable to sharing between those stations and meteorological aids station or line-of-sight fixed and mobile stations in the specified bands. The annex contains a description of the algorithm for making this check together with an illustrative example. This procedure is for use in checking compliance with power flux density is compared to the limits imposed for angles of arrival above the horizon of 5° or less. Examination of stations in non-geostationary orbit or those using narrow beam antennas and having angles of arrival exceeding 5° will require a departure from this procedure and must be examined on a case-by-case basis.

Similarly, the procedure in Annex B is not comprehensive enough to assess space stations for compliance with power spectral density limits as they may affect tropospheric scatter receivers in the above specified bands, nor can that procedure be used to determine compliance with the above-specified power flux density limits at the geostationary orbit from space stations using non-geostationary orbits. Such evaluations must be done on a case-by-case basis.

2. Power Flux Density Limits at the Geostationary Satellite Orbit

In the frequency band 8025 to 8400 MHz, which the earth exploration-satellite service using non-geostationary satellites shares with the fixed-satellite service (Earth-to-space) or the meteorological-satellite service (Earth-to-space), the maximum power flux density produced at the geostationary satellite orbit by earth exploration-satellite service space station shall not exceed -174 dBW/m² in any 4 kHz band.

3. Radio Astronomy in the Shielded Zone of the Moon

In the shielded zone of the Moon emissions causing harmful interference to radio astronomy observations and to other users of passive services shall be prohibited in the entire frequency spectrum except in the following bands:

**Power Flux Density and Receiver Input Power Limits at the Earth's Surface
from Space Stations Sharing with the Fixed and Mobile Services**

Frequency Band (MHz)	Space Radiocommunication Service	Angle of arrival (*) above the horizontal plane in degrees		
		0-5°	5-25°	25-90°
1670-1690 1690-1710 2025-2110 2200-2290 2290-2300	Meteorological-Satellite Meteorological- & Earth Explor- ation-Satellite (for countries mentioned in RR 740 and 741) Space Research, Space Operation, & Earth Exploration-Satellite Space Research, Space Operation, & Earth Exploration-Satellite Space Research	-154 dBW/m ² /4 kHz	-154 + 0.5(*-5) dBW/m ² /4 kHz	-144 dBW/m ² /4 kHz
3400-4200 4500-4800 7250-7750 7450-7550	Fixed-Satellite Fixed-Satellite Fixed-Satellite Meteorological-Satellite	-152 dBW/m ² /4 kHz	-152 + 0.5(*-5) dBW/m ² /4 kHz	-142 dBW/m ² /4 kHz
8025-8400 8400-8500	Earth Exploration-Satellite Space Research	-150 dBW/m ² /4 kHz	-150 + 0.5(*-5) dBW/m ² /4 kHz	-140 dBW/m ² /4 kHz

**Power Flux Density Limits at the Earth's Surface from Space Stations
Sharing with the Meteorological Aids Service**

Frequency Band (MHz)	Space Radiocommunication Service	Angle of arrival (*) above the horizontal plane in degrees
1670-1690 1690-1710	Meteorological-Satellite Meteorological- & Earth Explor- ation-Satellite (for countries mentioned in RR 740 and 741)	-133 dBW/m ² /1.5 MHz for all angles of arrival

**Interference Power Limits from Space Stations at the Receiver Input
of a Station in the Fixed Service Using Tropospheric Scatter**

Frequency Band (MHz)	Space Radiocommunication Service	Angle of arrival (*) above the horizontal plane in degrees
1670-1690 1690-1710 2025-2110 2200-2290 2290-2300	Meteorological- & Earth Explor- ation-Satellite Meteorological- & Earth Explor- ation-Satellite (for countries mentioned in RR 740 and 741) Space Research, Space Operation, Earth Exploration-Satellite Space Research, Space Operation, Earth Exploration-Satellite Space Research	Power Flux Density shall not cause an interference power level exceeding -168 dBW/4 kHz at the receiver input (see RR 2560).

**Power Flux Density Limits at the Geostationary Orbit from Space
Stations using Non-Geostationary Orbits**

Frequency Band (MHz)	Space Radiocommunication Service	Angle of arrival (*) above the horizontal plane in degrees
8025-8400	Earth Exploration-Satellite	-174 dBW/m ² /4 kHz

8.2.37 Control of Interference between Geostationary-Satellite Systems and Non-Synchronous Inclined Orbit-Satellite Systems

1. Non-geostationary space stations shall cease or reduce to a negligible level radio emissions, and their associated earth stations shall not transmit to them, whenever there is a) insufficient angular separation between the non-geostationary satellite and the geostationary satellites and b) unacceptable interference¹⁰ to geostationary satellite space systems operating in accordance with these regulations.

2. In the frequency band 29.95-30 GHz space stations in the earth exploration-satellite service on board geostationary satellites and operating with space stations in the same service on board non-geostationary satellites shall have the following restrictions:

Whenever the emissions from the geostationary satellites are directed towards the geostationary satellite orbit and cause unacceptable interference¹⁰ to any geostationary satellite space system in the fixed-satellite service these emissions shall be reduced to a level at or less than accepted interference.¹⁰

8.2.38 Station Keeping of Space Stations

1. Space stations on geostationary satellites shall have the capability of maintaining their positions within the tolerance specified.

2. Space stations on board geostationary satellites which use any frequency band allocated to the fixed-satellite service or the broadcasting-satellite service:¹¹

a. shall have the capability of maintaining their positions within ± 0.1 degrees of the longitude of their nominal positions;

b. shall maintain their positions within ± 0.1 degree of longitude of their normal positions; but

c. experimental stations on board geostationary satellites need not comply with a) or b) above, but shall maintain their positions within ± 0.5 degree of longitude of their nominal positions;

d. however, space stations need not comply with b) or c) above, as appropriate, as long as the satellite network to which the space station belongs does not cause unacceptable interference to any other satellite network whose space station complies with the limits

given in b) and c) above.

3. Space stations on board geostationary satellites which do not use any frequency band allocated to the fixed-satellite service or the broadcasting-satellite service:

a. shall have the capability of maintaining their positions within ± 0.5 degree of longitude of their nominal positions;

b. shall maintain their positions within ± 0.5 degree of longitude of their nominal positions; but

c. need not comply with b) above as long as the satellite network to which the space station belongs does not cause unacceptable interference¹¹ to any other satellite network whose space station complies with the limits given in b) above. 4. Space stations¹¹ on board geostationary satellites which are put into service prior to 1 January 1987, with advance publication information for the network having been published before 1 January 1982, are exempted from provisions of paragraph 2 above; however they

a. shall have the capability of maintaining their positions within ± 1 degree of the longitude of their nominal positions; but efforts should be made to achieve a capability of maintaining their positions at least within ± 0.5 degree of the longitude of their nominal positions;

b. shall maintain their positions within ± 1 degree of the longitude of their nominal positions; but

c. need not comply with b) above as long as the satellite network to which the space station belongs does not cause unacceptable interference¹¹ to any other satellite network whose space station complies with the limits given in b) above.

8.2.39 Pointing Accuracy of Antennas on Geostationary Satellites

1. The pointing direction of maximum radiation of any earthward beam of antennas (intended for less than earth coverage) on geostationary satellites shall be capable of being maintained within:

a. 10% of the half power beamwidth relative to the nominal pointing direction or

b. 0.3 degree relative to the nominal pointing direction, whichever is greater.¹²

2. In the event that the beam is not rotationally symmetrical about the axis of maximum radiation, the tolerance in any plane containing this axis shall be

related to the half power beamwidth in that plane.

3. This accuracy shall be maintained only if it is required to avoid unacceptable interference¹⁰ to the other systems.

8.2.40 Space Research in Bands other than those Allocated to the Space Research Service

In carrying out space developmental responsibilities, it is necessary and desirable that NASA conduct research by and on space techniques, especially in bands allocated to the various space services. Thus NASA may find it necessary to propose satellite research in various Government and non-Government bands. In general, assignments to space research space and earth stations will be experimental, i.e., on a non-interference basis to operational systems in accordance with the Table of Frequency Allocations.

8.2.41 Radiolocation and Active Sensor Operations Aboard Satellites

1. Radiolocation operations aboard satellites (class 1 and class 2 as defined in Part 5.3) shall be in the radiolocation service, shall be treated on a case-by-case basis, and shall be permitted in and restricted to the bands allocated to the radiolocation service.

2. Frequency assignments to active sensor operations aboard satellites shall normally be in one of the following frequency bands: 1215-1300 MHz, 3100-3300 MHz, 5250-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, 13.4-14.0 GHz, 17.2-17.3 GHz, 24.05-24.25 GHz and 78-79 GHz (pending WARC-79 implementation). Frequency assignments to active spaceborne sensors shall normally be made within these bands except in cases where the physical phenomenon cannot be satisfactorily measured in the allocated bands.

8.2.42 Wildlife and Ocean Buoy Tracking and Telemetry

Pursuant to footnote US210 to the National Table of Frequency Allocations, the use of frequencies in the bands 40.66-40.70 and 216-220 MHz may be authorized to U.S. Government radio stations on a secondary basis for the tracking of, and telemetry of scientific data from, ocean buoys and wildlife,

subject to the following conditions:

1. Airborne wildlife telemetry in the band 216-220 MHz will be authorized in only the 216.0-216.1 MHz portion of the band.

2. All transmitters shall be FCC type accepted, or the equivalent, as specified in Section 5.109, FCC Rules and Regulations.

3. Classes of emission shall be limited to N0N, A1D, A2D, F1D, F2D, F9D.

4. Occupied bandwidth shall not exceed 1 kHz.

5. Maximum carrier power shall not exceed 1 milliwatt for airborne wildlife applications, 10 milliwatts for terrestrial wildlife applications, and 100 milliwatts for ocean buoys.

6. In the band 216-220 MHz, the carrier frequency shall be maintained within 0.005 percent of the assigned frequency.

7. In the band 40.66-40.70 MHz, the bandwidth required for frequency tolerance plus the occupied bandwidth of any emissions must be adjusted so as to be confined within this band, except as permitted by paragraph 8 below.

8. The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

a. On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 decibels;

b. On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 decibels;

c. On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth; at least 43 plus $10 \log_{10}$ (mean output power in watts) decibels or 80 decibels, whichever is the lesser attenuation.

9. Wildlife telemetry in the 162-174 MHz band are authorized on a unprotected, non-interfering basis for the tracking of, and the telemetry from, wildlife. Multiple agency operations will be conducted under a Memorandum of Agreement between cooperating agencies and subject to the following conditions:

1. Radio frequency assignments on specific operational frequencies are maintained in the Government Master File (GMF).

2. Class of emission shall be limited to V1D.
3. Authorized bandwidth shall not exceed 1 kHz.
4. Maximum carrier power shall not exceed 10 mW.
5. The carrier frequency shall be maintained within 0.003 percent of the assigned frequency.

8.2.43 Frequency Assignments to Transportable Earth Stations in the 7300-7750 and 8025-8400 MHz Bands

Frequency assignments to transportable earth stations in the bands 7300-7750 and 8025-8400 MHz will be on a temporary/renewable basis with an expiration date not to exceed five years. These assignments may be used over a small geographical area, normally this area will not be in excess of radius of 48 kilometers from the assignment location. Operations within the confines of this geographical area may be restricted if such operations are in conflict with existing uses in the band. These area assignments may be further restricted if new requirements for authorized services indicate such restrictions are required in order to provide for compatible operations. In addition, those assignments for transportable operations (Special Note S362) in the bands 7300-7750 and 8025-8400 MHz shall bear the Special Note S370 (See Annex A).

8.2.44 Frequency Assignments for Fixed Service Stations 7900-7975 MHz

1. Those Fixed Service stations authorized in the 7900-7975 MHz band before April 15, 1981 and identified in IRAC Doc. 22017/2 may continue to operate and are protected from harmful interference from all earth stations of the DSCS-III Satellite System until January 1, 1984. After January 1, 1984, protection from harmful interference is provided to those Fixed Service stations identified in IRAC Doc. 22017/2 and authorized in:

- a. the 7900-7950 MHz band from DSCS-III earth stations that operate in the Fixed-Satellite Service and the Aeronautical Mobile-Satellite and the Land Mobile-Satellite Services; and,
- b. the 7950-7975 MHz band from all DSCS-III earth stations.

2. Such protection is limited to a 36 month period after written notice has been provided by the military department of their intent to operate an earth station in the 7900-7975 MHz band that may cause interference.

8.2.45 Frequency Assignments to Mobile Stations in Certain Frequency Bands Shared with Passive Sensors

Remote sensing operations conducted in the Earth Exploration-Satellite Service (passive) and the Space Research Service (passive) can be disrupted if interference power level arriving at the sensor approaches the level of natural radiation being measured by the sensor. Mobile systems have the potential for creating an interference environment which could make sharing with passive sensors difficult. Therefore, although US263 provisions apply, agencies requesting frequency assignments for mobile stations operating with transmitter powers in excess of 2 watts will consider other mobile bands to meet the required operation before assignments are requested in the following bands:

21.2-21.4 GHz	50.2-50.4 GHz	174.5-176.5 GHz
22.21-22.5 GHz	54.25-58.2 GHz	200-202 GHz
36-37 GHz	116-126 GHz	255-238 GHz
150-151 GHz		

8.2.46 Radiolocation Operations in the Band 15.7-17.3 GHz

Ground based and airborne radars, except those authorized before January 1983, shall have the capability to operate and perform their missions, when necessary, on a day-to-day basis in the sub-bands 15.7 to 16.2 and 16.2 to 17.3 GHz, respectively.

8.2.47 Development of Flight Test Telemetry in the 1710-1850 MHz Band

The development of flight test telemetry and associated telecommand systems is discouraged in the 1710-1850 MHz band. Such operations should be developed in bands designated for such purposes.

8.2.48 Trunked Land-Mobile Radio Systems

1. Trunked land-mobile radio systems may be established in any frequency band allocated to the Government on a primary basis for the fixed and mobile services. Accommodating a trunked system requires consolidation of existing land mobile systems by the applicant(s) unless they present justification.

2. Trunked land-mobile radio systems may be established by an individual agency or cooperatively by several agencies. Innovative methods of using commercial entities to design and operate trunking systems under sponsorship of one or more Federal agencies are encouraged. Frequency assignments for shared trunked land-mobile radiocommunication systems shall be obtained by the installing, sponsoring or lead agency which is responsible for managing the system. Individual user agencies are not required to obtain frequency assignments to share the system if operated in accordance with provisions of Paragraph 4, Section 9.1.2.

3. Trunked land mobile systems will be submitted to the Spectrum Planning Subcommittee for system review prior to application for frequency assignment. Data requirements for SPS submission are contained in Part 10.8. Unless otherwise approved by the SPS, all trunked systems must:

- a. Employ a method of priority access.
- b. Minimize the use of links which require a dedicated (non-shared) channel for the duration of the connection.
- c. Employ hard-copy system usage monitoring options for systems exceeding five channels. Hard-copy usage monitoring is encouraged for systems with five or fewer channels.
- d. Have the capability to rapidly restructure the network (priorities, groupings, etc.) via software control.

4. Federal agencies using trunked systems shall submit usage reports to the SPS for the first five years of operation. This data will be requested by NTIA annually and be used for statistical analysis of trunked systems operations. Usage reports will be the basis for the justification of additional channels.

Federal agencies will use the format shown in Section 10.8.3 for annual usage reports.

5. Federal agencies managing trunked systems shall allow access to the trunked system by other

Federal agencies where such access is technically and operationally feasible.

8.2.48a Land Mobile Radio Communications

1. Federal Government agencies implementing new land mobile communication systems and replacing aging ones should use available commercially offered land mobile services, or share land mobile services operated by other Federal, state or local government agencies whenever possible. When commercial or shared systems are unavailable, their use would not meet mission requirements, would cause unacceptable delays or disruptions, or would cost more than operating their own system, Federal Agencies may operate their own spectrum-efficient, cost-effective systems. Furthermore, Federal agencies are encouraged to consider implementing trunked land-mobile radio systems in accordance with 8.2.48.

2. The provisions in paragraphs 8.2.48a.3 to 6 apply to land-mobile systems operating in frequency bands above 30 MHz. Systems defined as tactical and training as explained in Section 8.2.12 are not included, however, those supporting training operations are included.

3. Agencies seeking to operate their own new land-mobile radiocommunication systems shall, before obtaining frequency assignment authorizations, establish and document their requirements. Agencies should first conduct a requirements' analysis commensurate with the size and complexity of their need. Using the results of the requirements' analysis as the basis, agencies shall conduct an analysis of alternatives to operating their own land mobile system commensurate with the size and complexity of the requirement to identify the most advantageous alternative to the Government. The analysis should address the use of NTIA-authorized trunked land mobile communication systems operated by other agencies or commercial services providers, and commercially offered land mobile radio services to determine their ability to meet mission requirements. This analysis shall be documented and retained by the submitting agency.

4. As a function of their oversight responsibility, NTIA will review authorization requests for selected land mobile systems prior to radio frequency authorization and may require the agency to submit

the retained analysis documentation.

5. All requests for frequency assignments to support Government owned and operated conventional or trunked land mobile radio systems within 30 km of an existing NTIA-authorized trunked land-mobile system, whether operated by a Federal agency or a commercial vendor, shall be accompanied by a justification that indicates why use of the existing system could not meet agency requirements. The agency FAS representative will be the primary point of contact, unless another Federal Official is identified, for obtaining additional information regarding the selection of a separate system. Criteria for selecting a separate system include:

a. Communications services are required in areas where the existing system cannot provide service, its use would not meet mission requirements, would cause unacceptable delays or disruptions, or would cost more than operating a separate system.

b. The existing system cannot provide the type or quality of service required, its use would not meet mission requirements, would cause unacceptable delays or disruptions, or would cost more than operating a separate system.

c. A separate system is required to fill a gap in the existing system, which will be generally used to meet the applicant's requirements.

NTIA may require, on a case-by-case basis, additional information including written technical details on the analysis undertaken by the applicant agency.

6. The procedures implemented under 8.2.48a.3 through 5 will be reviewed by the FAS every 12 months from the date they are put into use to recommend any changes needed to make the process operate more efficiently and effectively or if the procedures should be discontinued. The FAS shall provide a report documenting its review.

8.2.49 Specialized Mobile Radio Service

1. Federal Government agencies are authorized to use the Specialized Mobile Radio (SMR) service in the 806-824, 851-869, 896-901, and 935-940 MHz land mobile bands under the following conditions. Federal agencies shall not establish an SMR system or provide an SMR service in the above listed bands, but shall operate only as an END USER¹³ with a Federal Communications Commission (FCC) licensed private

carrier on a contractual basis. Since the SMR service is not considered to be in the Common Carrier service, frequency authorization to Federal agencies will be contingent upon the continuation of the negotiated contract with the private carrier. Federal agencies are encouraged to evaluate the efficiency and cost effectiveness between leasing an SMR service, establishing a new land mobile radio system, or expanding their existing system to satisfy their operational requirements.

2. SMR systems are established by private commercial carriers and licensed through the FCC. After successfully negotiating a contract to satisfy their requirement with a private carrier, Federal agencies will obtain frequency authorization through NTIA to operate in the band corresponding to that in which the private carrier has been licensed, in the geographic area by the FCC when becoming an END USER in the SMR service. Federal agencies shall not request SMR frequencies from the FCC.

3. Federal agencies submitting applications to NTIA to obtain frequency authority for SMR services will include the system name and the private carrier's name in the *SYS field and the EXACT NUMBER of mobiles in the *NRM field in accordance with Section 9.8.2, Paragraph 39 of this Manual.

8.2.50 Government/Non-Government Frequency Sharing in the 932-935 MHz and 941-944 MHz Bands

The bands 932-935 MHz and 941-944 MHz are shared by the Government and non-Government on a co-equal basis for the Fixed Service. Applications for assignments in these bands will be processed on a daily basis, and assignments will be made based on first come, first-served. Therefore, if a non-Government application is filed one or more days before a Government application, the non-Government application will be granted. The converse therefore also applies. If a situation arises where Government and non-Government applications are filed on the same day for the same frequency to be used in the same geographic location (mutually exclusive applications), and agreements cannot be made to satisfy one or both applicants, then a joint lottery shall be held to determine whether the Government or non-Government entity shall be assigned the frequency.

8.2.51 Redeployment Requirement of Weather Radars

Within the bands 2700-2900 MHz and 5350-5650 MHz, conventional magnetron or coaxial magnetron output tubes used in WSR-57, WSR-74S, WSR-74C, AN/FPQ-21 and AN/FPS-77 weather radars have inherent spurious emission levels that may cause radio frequency interference to digital radio-relay microwave systems in the 3700-4200 MHz and 5925-6425 MHz range. Prior to redeployment of these weather radars by any Federal agency, an RF waveguide filter which reduces the spurious emission levels by at least 40 dB shall be installed.

8.2.52 Government Use of the Band 220-222 MHz

1. Frequencies in the 220-222 MHz band are available for land mobile use for both Government and non-Government operations. This Section sets out the policies and procedures governing the authorization and use of Government systems operating in the 220-222 MHz band.

2. All Government systems operating in this band will be submitted to the Spectrum Planning Subcommittee for systems review under the provisions of Chapter 10 prior to submission of requests for frequency assignment.

3. As set forth in Section 4.3.15, two blocks of 5 contiguous channel pairs have been set aside for exclusive Government use in the development of nationwide systems and 140 channel pairs set aside for shared Government and non-Government local use.

4. Each application for review of a system using a nationwide block must certify that within ten years of receiving Certification of Spectrum Support from NTIA, the system will be fully constructed and all proposed channels in use. The application shall include a schedule for implementation of the system. The user shall file a systems progress report with the Frequency Assignment Subcommittee and the Spectrum Planning Subcommittee 2, 4, 6 and 10 years from the date of certification of spectrum support demonstrating compliance with the schedule. Failure to comply with the schedule will lead to forfeiture of existing assignments or curtailment of the

Certification of Spectrum Support for use of the nationwide block of channels unless sufficient justification as to why a progress report was not submitted or schedule was not met.

5. Each application for review of a non-nationwide system shall include a schedule for implementation. The period for implementation shall normally be one year but extensions up to 3 years may be authorized upon full justification. The user shall file a systems progress report with the Frequency Assignment Subcommittee and Spectrum Planning Subcommittee at the end of the implementation period approved in the Certification of Spectrum Support demonstrating compliance with the schedule. Failure to submit a progress report or comply with the approved schedule will lead to forfeiture of existing assignments or curtailment of the Certification of Spectrum Support unless sufficient justification as to why a progress report was not submitted or schedule was not met.

8.3 COORDINATION OF FREQUENCY USAGE

It is the responsibility of the agency proposing a new frequency assignment or a new radio station (transmitting or receiving), for which protection is desired from the operation of the same or other radio services, to ascertain from other agencies that may be involved whether harmful interference is likely to be caused to or from such proposed operations as a result of the established operations of those agencies.

8.3.1 Basic Coordination Arrangement Between the IRAC and the FCC

The following arrangement was agreed by the Interdepartment Radio Advisory Committee and the Federal Communications Commission on October 3 and 22, 1940, respectively:

The Interdepartment Radio Advisory Committee will cooperate with the Federal Communications Commission in giving notice of all proposed actions which would tend to cause interference to non-Government station operation, and the Federal Communications Commission will cooperate with the Interdepartment Radio Advisory Committee in giving

notice of all proposed actions which would tend to cause interference to Government station operation. Such notification will be given in time for the other agency to comment prior to final action. Final action by either agency will not, however, require approval by the other agency.

The two agencies will maintain up-to-date lists of their respective authorized transmitting frequency assignments.

8.3.2 Coordination of the Policy and Economic Aspects of Certain Government Proposals to Use Non-Government and Amateur Frequency Bands

As stated in Section 4.1.2, a Government frequency assignment may be authorized in a non-Government band provided the assignment is coordinated with the FCC.

Government use of non-Government frequency bands may involve policy and economic, as well as technical, considerations. In order that coordination of each of these aspects may be achieved in the assignment of frequencies to Government radio stations, within the United States and Possessions, which contemplate a) the use of a non-Government or amateur band above 25000 kHz, or b) the use of one or more frequencies below 25000 kHz which, because of probable impact upon assignments by the FCC, warrants special attention, the following procedures should be observed:

1. New uses not provided for by Chapter 7 and not covered by existing agreements with the FCC:

The Government agency concerned may coordinate the proposed assignment informally with the FCC.

If the matter can be readily resolved and if the FCC indicates that formal policy coordination with the Commission is not required, the agency desiring the assignment will submit an application to the IRAC for processing in accordance with established procedures.

Should there be a problem which cannot be resolved informally, or should the FCC indicate that formal policy coordination with the Commission is necessary, the matter will be referred to NTIA by the Government agency concerned for appropriate action.

Upon satisfactory completion of coordination with the FCC, NTIA will inform the Government agency concerned of the results and, upon acceptance by that agency of any conditions involved, instruct the IRAC to process the application, when filed by that agency, in accordance with established procedures.

2. Proposed assignments provided for by chapter 7 or those which are within the scope of existing agreements with the FCC:

The Government agency concerned will submit an application to the IRAC for processing in accordance with established procedures, supplemented, if appropriate, by advance informal coordination with the FCC.

3. These procedures notwithstanding, any Government agency may refer any such matters to NTIA whenever the agency considers it desirable to do so.

8.3.3 Coordination of Frequencies Used for Communication with Non-Government Stations Licensed Under Part 90 of the FCC Rules

Provision is made in part 7.12 for a Government radio station to use any frequency authorized to a non-Government radio station under Part 90 of the Rules of the Federal Communications Commission where such utilization is necessary for intercommunication with non-Government stations or required for coordination with non-Government activities, provided a mutually-approved arrangement has been concluded between the Government agency concerned, the Federal Communications Commission, and the non-Government licensee involved.

Two steps are required to conclude a mutually-approved arrangement. The Government agency must obtain from the non-Government licensee a written certification that the Government operation is necessary, and, after receipt of the certification, the Government agency must coordinate the proposed usage with the FCC.

8.3.4 Coordination of Military Use of Non-Government Bands at Test Ranges and for Tactical and Training Operations

See section 7.15.3 and part 7.17.

8.3.5 Intra-Military Coordination of Frequency Applications

Army, Navy, and Air Force dockets for the FAS agenda will have had complete military coordination and will normally be concurred in by the three military services at the FAS meetings.

If, due to unforeseen circumstances, it becomes necessary for one of the military services to request tabling of another military service's docket that appears on the regular agenda, the docket will be tabled. If there is no resolution at the next regular FAS meeting, the docket will be withdrawn unless the applicant requests referral to IRAC.

8.3.6 Coordination for the Use of Hydrologic Channels in the Bands 162-174 and 406.1-420 MHz

The frequencies shown in paragraph 1 of Section 4.3.3 are primarily for hydrologic operations. Federal Government agencies may also use these frequencies for non-hydrologic purposes when all other possibilities (except AGA(4) channels) have been exhausted, and when such use will not conflict with present or probable future hydrologic operations. In either case, Hydrology Subcommittee coordination must be accomplished prior to the assignment of any hydrologic channel by the FAS.

1. *The Hydrology Subcommittee.* The Hydrology Subcommittee of the Federal Interagency Advisory Committee on Water Data is responsible for coordinating all requests for the use of hydrologic channels, and for providing comments on such requests to the FCC and the FAS Secretariat.

a. *The Hydrologic Radio Frequency Coordination Group.* The Hydrology Subcommittee has designated its Hydrologic Radio Frequency Coordination Group (HRFCG) to review all requests for the use of hydrologic channels, and to provide comments on the suitability of the proposed operations.

b. *The Hydrologic Radio Frequency Coordinator.* The Hydrologic Radio Frequency Coordinator, who is Chairman of the HRFCG, forwards requests for the use of hydrologic channels to the members of the Coordination Group. Upon completion of HRFCG review, the Coordinator advises applicants of the

results of Hydrology Subcommittee coordination.

2. *Preparing Proposals for Submission to the Hydrology Subcommittee.* A Federal agency having a requirement to use a hydrologic channel, whether for hydrologic or non-hydrologic purposes, shall prepare a proposal as outlined in subparagraph a below. Additionally, if the frequency will be used to support *hydrologic* operations, the applicant shall comply with the special instructions in subparagraph b; if for *non-hydrologic* operations, the applicant shall comply with the provisions of subparagraph c.

a. *General Instructions.* All proposals for the use of hydrologic channels shall consist of the following basic elements:

(1) An Application for Frequency Assignment Action, completed in accordance with Part 9.8 of this Manual. All such applicants shall bear Record Note C075.

(2) A cover letter containing (at a minimum) the name, mailing address, and telephone number of the applicant.

b. *Special Instructions for Hydrologic Proposals.* If the frequency is to be used for hydrologic purposes, the applicant shall provide the following additional information in either the cover letter, the Agency Remarks (*AGN) or Supplementary Details (SUP) fields of the application, or in a separate attachment to the proposal package:

(1) Type of station (*i.e.* relay, command, or sensing).

(2) Kind of data to be transmitted (*e.g.* river stage, precipitation, etc.).

(3) Operation schedule (*e.g.* on call, automatic for 15 minutes each hour, etc.).

(4) A map showing the location of transmitting and receiving stations. A coordinate grid (latitude and longitude) must be shown on the map.

(5) The name of the Government agency sponsoring this application, along with supporting documentation.

c. *Special Instructions for Non-Hydrologic Proposals.* If the frequency is to be used for non-hydrologic purposes, the following special instructions apply:

(1) Before deciding to use a hydrologic channel, the applicant must first go through the standard frequency selection process as described in the IRAC Supplement to the NTIA Manual:

--First choice shall be given to those frequencies which bear the applicant's own symbol;

--Second choice to those bearing the symbol AGA, except AGA(4) and AGA(8);

--Third choice to those bearing the symbol of another agency;

--Fourth choice to those bearing the symbol of AGA(8); and

--Fifth choice to those bearing the symbol of AGA(4).

(2) Once the first three choices have been eliminated, and it has been determined that a hydrologic channel is needed, the applicant shall record the selected frequency with the FAS Secretariat in accordance with Section 8.3.18.

(3) If the frequency is to be used exclusively in a point-to-point configuration (*i.e.* no mobile stations, either transmitting or receiving, are involved), the applicant shall include in the proposal a simplified *network* diagram showing how the frequency will be employed.

3. The Coordination Process

a. *Submitting Proposals to the Hydrology Subcommittee.* Submit the original and nine copies of each proposal and all required supporting documents to:

NOAA National Weather Service (W/OH)
Hydrologic Radio Frequency Coordinator
1325 East-West Highway, SSMC2/WS-8144
Silver Spring, MD 20910

NOTE: At this point the requesting agency may, at its option, also submit a formal application to the FAS. See paragraph 4 for details.

b. *Requesting Expedited Action.* The Hydrology Subcommittee makes every effort to expedite action if the need is so stated in the original request.

c. *Review by the HRFCG.* The Coordinator sends a copy of each proposal to the HRFCG members for review and comment. HRFCG members:

(1) Compare the proposal against other pending requests and records of existing installations.

(2) Evaluate the proposal for its effect on probable future hydrologic operations.

(3) If the frequency is required for hydrologic purposes, determine whether the proposed

operation warrants the use of a hydrologic channel.

(4) Provide comments to the Coordinator.

d. *Resolving Objections to Hydrologic Proposals*

(1) If HRFCG members present objections to a hydrologic proposal, the Coordinator will recommend counter-proposals. If a counter-proposal is acceptable, he will then advise the applicant of required revisions to the original proposal in order to overcome the objections.

(2) If HRFCG members cannot reach agreement on any request, that particular case will be referred to the full Hydrology Subcommittee for decision.

e. *Notifying the Applicant*

(1) Upon completion of HRFCG review, the Coordinator will provide written coordination comments to the applicant, with a copy to the FAS Secretariat.

(2) In the event that the coordination comments are unfavorable, the provisions of Part 10.5 apply.

(3) Hydrology Subcommittee coordination comments are valid for a period of three months. If the requesting agency does not submit a formal application to the FAS within this period, it must resubmit the request to the Hydrology Subcommittee for reconsideration.

4. *Submitting Applications to the FAS.* The requesting agency may submit its Application for Frequency Assignment Action to the FAS at any time after initiating the hydrologic coordination process. Supporting documents required by the Hydrology Subcommittee, such as maps and network diagrams, normally need not be submitted to the FAS. If the application appears on the FAS agenda before receipt of Hydrology Subcommittee comments by the FAS Secretariat, the request will be tabled until the coordination process has been completed.

a. The FCC shall ensure non-Government applications submitted to the FAS include the name or abbreviation (Annex G) of the sponsoring Government agency in the Circuit Remarks (*AGN) or Supplemental Details field.

b. *Routine Modifications and Five-Year Reviews.* If the modification will appear on the routine FAS agenda, it need not be sent to the Hydrology Subcommittee for re-coordination.

c. *Significant Modifications.* If the modification will appear on the regular FAS agenda, the applicant will submit an Application for Frequency Assignment Action (original and eight copies) to the Hydrologic Radio Frequency Coordinator. According to the nature of the modification, the Coordinator will effect whatever coordination is considered necessary.

d. *Wireless Microphone Systems.* Coordination with the Hydrology Subcommittee is not required for wireless microphone systems using the channels listed in Section 4.3.2.

8.3.7 Coordination of Meteorological Aids Operations in the Bands 400.15-406 and 1668.4-1700 MHz

The characteristic frequency drift of radiosonde equipment and the requirement for flexibility in the operation of radiosondes preclude effective suballocation, channeling, or the granting of authority to use specific frequencies in the bands 400.15-406 and 1668.4-1700 MHz. The shared use of these bands corresponds essentially, for interference considerations, to shared use of a single nominal centerband frequency assignment.

Interference to the meteorological aids service that can result in spoiled observations is, by the nature of the service and the resources usually available, inherently difficult to identify and locate.

Mutual interference is possible between radiosondes operating simultaneously within 160 kilometers of each other. Line-of-sight distance to the horizon is greater than 480 kilometers from a radio-sonde at an altitude of 15 kilometers.

Since these bands are available for the use of all Government agencies responsible for the conduct of meteorological observations, each agency shall take appropriate measures to avoid interference through local coordination of specific operations if interference is indicated.

In application of allocation footnote US99, whenever it is necessary to operate radiosondes in the band 1668.4-1670 MHz within the United States, notification of the operations shall be sent, as far in advance as possible, to the Division of Astronomical Sciences, National Science Foundation, 4201 Wilson Boulevard, Room 1045, Arlington, Virginia 22230, with a copy to the Executive Secretary, IRAC.

8.3.8 Coordination of Radio Operations in the Vicinity of Fort Huachuca, Arizona

In order to minimize possible mutual harmful interference between electronic tests of the U.S. Army Electronic Proving Ground (USAEPG), Fort Huachuca, Arizona, and the transmissions of Government radio stations located in the vicinity of Fort Huachuca, each agency having radio operations in the coordination zone given below shall notify the Area Frequency Coordinator, Fort Huachuca, or the Army IRAC Representative, of the frequency, power, location, and type emission of the radio operations. In addition, the local address and telephone contact of the office or persons supervising or operating such stations should be reported if applicable. Transmissions of mobile stations located within 24 kilometers of Fort Huachuca (31°31'48" N, 110°21'05" W) shall be minimized to the extent feasible.

The coordination zone is the area bounded by connecting lines running along Highway 80 from Tucson to Bisbee, due south from Bisbee to the international border, west along the border to a point due south of Dateland, due north to Dateland, along Highway 80 from Dateland to Gila Bend, and along Highway 84 from Gila Bend to Tucson (traffic on Highways 80 and 84 excluded).

For the protection of the USAEPG, signal levels should not exceed the following limits within 24 kilometers of Fort Huachuca:

10-540 kHz--20 millivolts per meter
 540-1600 kHz--50 millivolts per meter
 1.6-20 MHz--20 millivolts per meter
 20-54 MHz--50 millivolts per meter
 54-148 MHz--20 millivolts per meter
 above 148 MHz--50 microvolts per meter

8.3.9 Coordination of Assignments to Stations (Other than Mobile and Transportable) to be Located in the National Radio Quiet Zone

1. The National Radio Quiet Zone (NRQZ) was established in IRAC Document 3867/2, 26 March 1958, subparagraph (a), for the protection of radio astronomy observations. The NRQZ encompasses an area of approximately 33,700 square kilometers of

Virginia and West Virginia as shown on the map, Figure 1. This area encloses:

a. The National Radio Astronomy Observatory site at Green Bank, Pocahontas County, West Virginia, and

b. The Navy Research Station site at Sugar Grove, Pendleton County, West Virginia.

2. In order to minimize harmful interference to operations at the sites designated above, all requests for frequency assignments to stations within the area--

South of 39°15' N

North of 37°30' N

West of 78°30' W

East of 80°30' W

shall be coordinated by the applicant, prior to authorization, with:

Director (Attn: Interference Office)
National Radio Astronomy Observatory
P.O. Box 2
Green Bank, West Virginia 24944
Telephone 304-456-2107

This procedure applies to all stations except mobile and transportable stations.

3. The Record Note C081 will be inserted in the NOTES (NTS) field on all such assignment requests. These assignment requests shall not be approved until notice of successful coordination has been received from the NRQZ coordinator.

8.3.10 Coordination of Assignments to Stations Located in the Vicinity of the United States/Canada Borders

The United States/Canada Agreement relating to the Coordination and Use of Radio Frequencies above 30 MHz provides for the coordination by the IRAC with the Canadian Department of Communications of certain frequency assignments. The text of the applicable portion of the Agreement is given in Part 3.4. This Agreement, in many cases, contains multiple coordination channels, e.g., assignments in the bands 1215-1400 MHz, 2700-3700 MHz, and 8500-10500 MHz are indicated in the Index of the Technical

Annex to the Agreement as being coordinated between the JCS on the U.S. side and CDS on also indicated as being coordinated by FAA with DOT, Canada. To ensure that comments concerning proposals received from Canada under the terms of the Agreement take into consideration the comments of other authorized U.S. coordination agencies, the agency receiving proposals from Canada will coordinate its reply to Canada with all U.S. agencies also indicated in the Agreement as a Coordination Agency for the band or portion of the band in which the proposed frequency is located.

8.3.11 Coordination of Frequency Usage Outside the United States and Possessions

In order that harmful interference may be avoided insofar as possible, Government agencies shall coordinate with the IRAC the use of frequencies by their stations located outside the United States and Possessions. Coordination ordinarily shall be limited to stations likely to cause harmful interference to those authorized by NTIA or the FCC. Coordination of the use of frequencies by military stations shall be subject to the requirements of military urgency and security. However, all U.S. Government radio stations operated within the Trust Territory of the Pacific Islands (Republic of Palau), except those of the U.S. military, shall be coordinated with the FAS prior to activation. All U.S. Government radio stations operated in the Federated States of Micronesia and the Republic of the Marshall Islands shall be coordinated with the U.S. Competent Authority in accordance with Annex L.

An agency initiating coordination in the FAS under this section may use either of these methods:

a. Using the procedure of Chapter 9 of the Manual with the Note S141 in the NOTES (NTS) field when listing in the Government Master File is desired.

b. By Memorandum providing the essential assignment details.

Comments of the FAS shall be entered in the FAS Meeting Minutes.

Figure 1. National Radio Quiet Zone

(Full Page Art)

8.3.12 Coordination of Assignments for Transmissions by Terrestrial Stations Located Within the Coordination Area of a Receiving Earth Station

1. General Provisions

a. Before an assignment to a terrestrial station is brought into use within the coordination area of a receiving earth station of another country utilizing the same band above 1 GHz allocated internationally with equal rights to terrestrial and space radiocommunication services (space-to-Earth) and within the bands listed in 2 below, coordination must be effected with that country to ensure interference will not be caused to the receiving earth station. (See 1148-1158, ITU Radio Regulations.)

b. Nationally, the ITU procedure for coordinating terrestrial stations also is followed to identify possible interference to receiving earth stations located within the United States and Possessions.

2. Frequency Bands

a. The coordination procedure specified in this Section applies in the following frequency bands:

1215-1260 MHz
1559-1610 MHz
1670-1710 MHz
2200-2300 MHz
3600-3700 MHz
4500-4800 MHz
5000-5250 MHz
7250-7750 MHz
8025-8500 MHz
15.4-15.7 GHz
81-84 GHz
102-105 GHz
134-142 GHz
149-164 GHz
190-200 GHz
231-241 GHz
252-265 GHz

b. The procedure for obtaining terrestrial station frequency assignments located within the coordination area of a receiving earth station along the U.S./Canadian and U.S./Mexican Border has not yet been established for the 3500-3600 MHz frequency band.

3. Specific Provisions

a. For major terrestrial systems, or major modifications of existing systems, national and international coordination will be initiated during the systems review procedure outlined in Chapter 10. The

SPS shall initiate coordination, as appropriate, with the country having the receiving earth station.

b. For assignments to terrestrial stations in systems not considered under the systems review procedure, Chapter 10, and to be located within the coordination area of a United States receiving earth station listed in Section 8.3.15, the applicant shall effect prior coordination with the agency operating the receiving earth station. In cases where such terrestrial stations are within the coordination area of a receiving earth station of another country listed in Section 8.3.15, the applicant shall provide to the FAS, in addition to the application for frequency assignment, the data required by No. 1160 of the ITU Radio Regulations. The FAS, as appropriate, shall initiate the international coordination required.

c. Final assignment action shall not be taken in the FAS until national coordination has been accomplished, and international coordination has been initiated, where it has been determined to be necessary.

d. The provisions of this Section are equally applicable to any proposed change in the technical characteristics of a currently authorized frequency assignment for transmission by a terrestrial station, if the change increases the probability of harmful interference being caused by the terrestrial station.

e. Coordination pursuant to this Section is not required for an experimental station or for a station whose frequency assignment would not be in accordance with the National Table of Frequency Allocations.

8.3.13 Coordination of Assignments for Transmission or Reception by Earth Stations

1. General Provisions

a. Before an assignment to an earth station, whether for transmitting or receiving, is brought into use in a particular band allocated with equal rights to space and terrestrial radiocommunication services in the spectrum above 1 GHz and in the bands listed in 2 below, coordination must be effected with any country whose territory lies within the coordination area of the earth station to ensure that interference will not be caused to or by terrestrial stations. (See 1107-1111, ITU Radio Regulations.) The coordination area is calculated in accordance with

Appendix 28, ITU Radio Regulations.

b. Nationally, the ITU procedure for coordinating earth stations also is followed to identify possible interference between such earth stations and terrestrial stations located within the United States and Possessions.

c. Coordination contours should be submitted to:

(1) The Spectrum Planning Subcommittee as part of the system review procedure outlined in Chapter 10, when submitting Notices of Frequency Assignment for earth stations for use in international coordination and registration activities.

(2) Subsequent to NTIA assignment approval the contours for all earth stations of the U.S. Government or of foreign administrations when such contours both include territory of the U.S. and operate in bands used by U.S. Government terrestrial stations shall be published in the NTIA Manual.

d. A computer program for the calculation of coordination areas is being developed jointly by the NTIA, Department of Commerce and the Electromagnetic Compatibility Analysis Center (ECAC), Department of Defense. This computer program should be used by Government agencies required by the provisions of this Section. Agencies desiring direct access to the computer program should contact the Spectrum Engineering and Analysis Division, NTIA. Agencies not equipped to access the NTIA computer may request NTIA to furnish the service.

2. Frequency Bands

The coordination procedure specified in this Section applies in the following frequency bands:

1215-1260 MHz
1427-1429 MHz
1559-1610 MHz
1670-1710 MHz
1761-1842 MHz
2025-2120 MHz
2200-2300 MHz
4500-4800 MHz
5000-5250 MHz
7125-7235 MHz
7250-7750 MHz *
7900-8500 MHz *
15.4-15.7 GHz
39.5-40.5 GHz
42.5-47 GHz
47.2-50.2 GHz
50.4-51.4 GHz
66-71 GHz

71-75.5 GHz
81-84 GHz
92-100 GHz
102-105 GHz
134-142 GHz
149-164 GHz
190-200 GHz
202-217 GHz
231-241 GHz
252-275 GHz

* Nationally, coordination contours are not required in the bands 7250-7300 MHz and 7900-8025 MHz.

3. Specific Provisions

a. Coordination relating to earth stations will be initiated by the SSG of the SPS as outlined in Section 3.3.2. National and international coordination shall be initiated in the SSG/SPS.

b. Applications for frequency assignments to earth stations shall indicate the status of coordination with agencies and countries having terrestrial operations in the same band and within the coordination area of the earth station. Final assignment action shall not be taken by the FAS until national coordination has been accomplished, and international coordination initiated where it has been determined to be necessary.

c. The provisions of this Section are equally applicable to any proposed change in the technical characteristics of a currently authorized frequency assignment, for transmission or reception by an earth station, if the change increases the probability of harmful interference being caused to or by a terrestrial station.

8.3.14 Coordination of Assignments to Earth and Space Stations Which Utilize Geostationary Satellites

1. General Provisions

a. Before bringing into use an assignment to an earth or space station in a system using the geostationary orbit, coordination must be effected, in certain cases, with other countries operating or planning such systems in the same band to ensure compatibility between different space systems. (See 1060-1071, ITU Radio Regulations.) Coordination is required if the proposed system would cause a 6% or greater increase in equivalent satellite-link noise temperature of other space systems. (See Appendix 29, ITU Radio Regulations.)

b. Nationally, the ITU procedure for coordinating assignments to stations in systems using the geostationary orbit also is followed to identify possible interference to other U.S. systems using the geostationary orbit.

c. A computer program for the calculation of increase in equivalent satellite-link noise temperatures is being developed jointly by the NTIA, Department of Commerce and the Electromagnetic Compatibility Analysis Center (ECAC), Department of Defense. This Computer Program should be used by all Government agencies for the computation of changes in equivalent satellite-link noise temperature. Agencies desiring direct access to the computer program should contact the Spectrum Engineering and Analysis Division, NTIA. Agencies not equipped to access the NTIA computer may request NTIA to furnish the service.

2. Specific Provisions

a. Coordination of space systems which utilize the geostationary orbit will be initiated by the SSG of the SPS as outlined in Section 3.3.2.

b. For systems utilizing the geostationary orbit which require international advance publication and coordination under the provisions of Nos. 1042 and 1060-1071, ITU Radio Regulations, the SSG shall initiate publication and coordination, as appropriate, with the IFRB and the country(ies) involved.

c. Applications for frequency assignments to either earth or space stations in systems using the geostationary orbit shall indicate the status of coordination with agencies and countries having or planning space systems in the same band which employ the geostationary orbit. Final assignment action shall not be taken by the FAS until national coordination has been accomplished, and international coordination has been initiated, where it has been determined to be necessary.

8.3.15 List of Coordinated Earth Stations

Transmitting Earth Stations

BAND (MHz)	LOCATION	COORDINATES	NOMINAL COORDINATION DISTANCE* (STATUE MILES)	IRAC OR FAS DOCKET	AGENCY
1761-1842	Andersen AFB, Guam		See Annex B		AF
1761-1842	Buckley Field, CO		363	I7106428-A	AF
1761-1842	Kaena Pt., HI		See Annex B		AF
1761-1842	New Boston, NH		See Annex B		AF
1761-1842	Vandenburg AFB, CA		See Annex B		AF
1761-1842	Fairchild, WA	4734XXN 11810XXW	363 Land, 978 sea	7321494	AF
1761-1842	Loring, ME	4700XXN 06810XXW	363 Jand, 978 sea	7321493	AF
2025-2035	Honolulu, HI		See Annex B		C
2025-2035	Seattle, WA		See Annex B		C
2025-2035	Wallops Island, VA		See Annex B		C
2025-2110	Fairbanks, AK		See Annex B		NASA
2025-2110	Goldstone, CA		See Annex B		NASA
2025-2110	Greenbelt, MD		See Annex B		NASA
2025-2110	Merritt Island, FL		See Annex B		NASA
2025-2110	Rosman, N.C.		See Annex B		NASA
2025-2110	Guam	131833N 1444404E	945	11589	NASA
2025-2110	Kauai, HI	220700N 1594016W	750	10782	NASA
2025-2120	Shirley Bay, Ontario		See Annex B		Canada
2110-2120	Goldstone, CA		See Annex B		NASA
5925-6425	Bouchette, Ontario	461318N 0755230W	280	11804	Canada
5925-6425	Mill Village, Nova Scotia	441119N 0644012W	500	11804	Canada
7900-7975, 8025-8400	Brandywine, Md	384040N 0765942W	217 Land, 471 sea	12997	AF
7900-7975, 8025-8400	Camp Roberts, CA		See Annex B		AR
7900-7975, 8025-8400	Fort Dix (Lakehurst), NJ		See Annex B		AR
7900-7975, 8025-8400	Finegayan, Guam		See Annex B		N
7900-7975, 8025-8400	Wahiawa, HI		See Annex B		N
7900-7975, 8025-8400	Northwest, VA		See Annex B		N
7900-7975, 8025-8400	Eareckson AFB, AK		See Annex B		AF
7900-7975, 8025-8400	Carp, Ontario		See Annex B		Canada
7900-7975, 8025-8400	Fort Detrick, MD		See Annex B		AR
7900-7975, 8025-8400	Onizuka (Sunnyvale) AFS, CA		See Annex B		AF
7900-7975, 8025-8400	Offutt AFB, NE		See Annex B		AF
7900-7975, 8025-8400	Manchester, NH		See Annex B		AF
7900-7975, 8025-8400	Elmendorf, AK		See Annex B		AF
7900-7975, 8025-8400	Ft. Gordon, GA		See Annex B		AR
8025-8400	Cabre de Tierra, PR		See Annex B		N

* The nominal coordination distance shown is the maximum coordination distance for flat terrain on an overland path or, if applicable, on an over-water path. It does not take into account the effects of possible terrain shielding.

Receiving Earth Stations

Band (MHz)	Location	Coordinates	Nominal Coordination Distance* (statue miles)	IRAC or FAS Docket	Agency
1670-1690	Hanscom Fld., MA		See Annex B		AF
1670-1710	Suitland, MD		See Annex B		C
1670-1710	Wallops Island, VA		See Annex B		C
1670-1710	Boulder, CO		See Annex B		C
1670-1710	Honolulu, HI		See Annex B		C
1670-1710	Seattle, WA		See Annex B		C
1700-1710	Katsuura, Japan		See Annex B		Japan
1700-1710	Masuda, Japan		See Annex B		Japan
2200-2290	Goldstone, CA		See Annex B		NASA
2200-2290	Greenbelt, MD		See Annex B		NASA
2200-2290	Guam	131833N 1444404E	935	11589	NASA
2200-2290	Kauai, HI	220731N 1594003W	935	11589	NASA
2200-2290	Merritt Island, FL		See Annex B		NASA
2200-2290	Rosman, NC		See Annex B		NASA
2200-2290	Fairbanks, AK		See Annex B		NASA
2200-2290	Shirley Bay, Ontario		See Annex B		Canada
2200-2300	Andersen AFB, Guam		See Annex B		AF
2200-2300	Buckley Field, CO	3943XXN 10446XXW	366	I7106428-A	AF
2200-2300	Cape Kennedy, FL	2824XXN 08030XXW	366 land, 992 sea	I7106428-A	AF
2200-2300	Fairchild AFB, WA	4730XXN 11810XXW	353 land, 945 sea	I7106428-A	AF
2200-2300	Kaena Pt., HI		See Annex B		AF
2200-2300	Loring AFB, ME	4700XXN 06801XXW	353 land, 945 sea	I7106428-A	AF
2200-2300	New Boston, NH		See Annex B		AF
2200-2300	Eareckson AFB, AK	5243XXN 17407XXE	254 land, 589 sea	I7106428-A	AF
2200-2300	Vandenberg AFB, CA		See Annex B		AF
2290-2300	Goldstone, CA		See Annex B		NASA
3700-4200	Bouchette, Quebec	461318N 0755230W	295	11804	Canada
3700-4200	Mill Village, Nova Scotia	441119N 0644012W	470	11804	Canada
7300-7750	Brandywine, MD	384040N 0765042W	105 land, 295 sea	12997	AF
7300-7750	Camp Roberts, CA		See Annex B		AR
7300-7750	Fort Dix (Lakehurst), NJ		See Annex B		AR
7300-7750	Finegayan, Guam		See Annex B		N
7300-7750	Wahiawa, HI		See Annex B		N
7300-7750	Northwest, VA		See Annex B		N
7300-7750	Eareckson AFB, AK		See Annex B		AF
7300-7750	Carp, Ontario		See Annex B		Canada
7300-7750	Fort Detrick, MD		See Annex B		AR
7300-7750	Elmendorf, AK		See Annex B		AF
7300-7750	Onizuka (Sunnyvale) AFS, CA		See Annex B		AF
7300-7750	Offutt AFB, NE		See Annex B		AF
7300-7750	Manchester, NH		See Annex B		AF
7300-7750	Ft. Gordon, GA		See Annex B		AR
7300-7750	Cabre de Tierra, PR		See Annex B		N
8400-8500	Goldstone, CA		See Annex B		NASA

* The nominal coordination distance shown is the maximum coordination distance for flat terrain on an overland path or, if applicable, on an over-water path. It does not take into account the effect of possible terrain shielding.

8.3.16 Procedures for Field Level Coordination of the Use of the Frequencies 1030 and 1090 MHz and Frequencies in the Bands 1215-1400, 2700-2900 and 9000-9200 MHz

1. Applicability--These procedures are applicable for all frequency assignment actions for use by U.S. Government radio stations within the U.S. and Possessions for the purposes indicated:

1030 MHz--Interrogators

1090 MHz--Ground Transponders

1215-1400 MHz--Radars

2700-2900 MHz--Radars

9000-9200 MHz--Radars

These procedures are implemented to provide for the local selection of frequencies and minimize, through effective coordination, the possibility of harmful interference.

2. Field Level Coordinators--The Federal Aviation Administration (FAA), as the National Airspace System (NAS) manager and having primary responsibility for flight safety, has established Regional Frequency Management offices throughout the U.S. and Possessions to effect field level selection and coordination of frequencies used for control of aeronautical operations within the NAS. Annex D, Table 1 is a list of FAA Regional Coordinators and indicates their geographical areas of responsibility and Figure 1 is a map depicting those areas.

3. Procedures

a. General--All proposed frequency assignment actions as described above shall be coordinated by the applicant with the appropriate FAA Regional Coordinator. The FAA Regional Coordinator will recommend a frequency and pulse repetition rate (PRR) based on the applicant's requirements and the technical particulars furnished by the applicant. If an interference free frequency or PRR can not be engineered, the FAA Regional Coordinator will inform the applicant of such and will recommend alternatives and/or restrictions to preclude such interference problems.

b. Interrogators (1030 MHz) and Transponders (1090 MHz)

(1) The concentration of usage for secondary surveillance radar (SSR) (IFF/SIF) systems on a single pair of frequencies, 1030 MHz and 1090 MHz,

requires special measures to assure compatibility of operations. Strict control of operational parameters (i.e., power, pulse repetition rate, side lobe suppression, etc.) is necessary to prevent unacceptable degradation to the military mission and flight safety.

(2) Agencies shall cooperate with the FAA in the coordination, selection, and control of critical operational parameters to provide optimum sharing and maximum assurance of compatible operations within the limits of equipment availability and operational requirements. This cooperation shall include timely responses to FAA proposals for changes of PRRs, powers, SLS, etc., which may be required for relief of harmful interference, and submission of a modification or replacement action to the FAS to amend that frequency assignment record.

(3) Accordingly, all Government agencies requiring the use of 1030 MHz for interrogators or 1090 MHz for ground transponders, and either frequency for test equipments that radiate pulsed emissions, shall, prior to filing applications for new and modified requirements, coordinate the planned operational parameters for each new interrogator or ground transponder and every change of each existing interrogator with the appropriate FAA Regional Coordinator listed in Annex D, Table 1.

(4) Shipboard Interrogators--Operational agreements with the applicable FAA Regional Coordinator are required when operations are within 185 kilometers of the U.S. Coast or its possessions or as modified by local agreement. Further coordination is not required when parameters are within guidelines established by operational agreements.

(5) Land-based Mobile Interrogators--Operational agreements with the applicable FAA Regional Coordinator are required when an interrogator is to be operated at transient locations, such as during military maneuvers. Further coordination is not required when parameters are within guidelines established by operational agreements.

(6) Airborne Interrogators--Prior national-level coordination is required and operational capabilities and parameters must be established when an interrogator is operated airborne. Further coordination is not required when parameters are within established guidelines.

c. Radars (1215-1400, 2700-2900, 9000-9200

MHz)

(1) The concentration of usage for radar systems requires special measures to assure compatibility of operations. The planning, coordination, and control required to provide separation between frequencies and pulse repetition rates and operations within mutual interference range, are necessary to prevent unacceptable degradation where flight safety and meteorological radars are concerned.

(2) Agencies shall cooperate with the FAA in the coordination, selection, and control of power, frequencies and PRRs to provide optimum sharing and maximum assurance of compatible operations within the limits of equipment availability and operational requirements. This cooperation shall include timely responses to FAA proposals for changes of power, frequencies and PRRs which may be required for relief of harmful interference, and submission of a modification or replacement action to the FAS to amend that frequency assignment record.

(3) Accordingly, all Government agencies requiring the use of 1215-1400, 2700-2900, 9000-9200 MHz for radars and for test equipments that radiate pulsed emissions, shall, prior to filing applications for new and modified requirements, coordinate the planned power, frequencies and PRRs for new radars and every change of existing radars through the appropriate FAA Regional Coordinator listed in Annex D, Table 1.

(4) There are certain areas in the United States where it is difficult to accommodate additional radars in the 2700-2900 MHz band (see Annex D, Figure 2 and TABLE 2). Radar systems which comply with RSEC Criteria D, under Part 5.3 of this manual, have the capability of incorporating additional Electromagnetic Compatibility (EMC) provisions to enhance their accommodation in designated heavily used areas or for collocated operation. The FAA Regional Coordinator and the agency requesting the assignment will assess the requirement for these additional EMC provisions when coordinating frequency assignments in the 2700-2900 MHz band. Frequency assignments in designated heavily used areas or for collocated operation for radars which comply with RSEC Criteria D and do not have the additional EMC provisions installed, shall bear the Record Note S373 (see Annex A).

(5) Shipboard Radars--Operational agreements

with the applicable FAA Regional Coordinator are required when operations are within 100 NM of the U.S. Coast or its possessions or as modified by local agreement. Further coordination is not required when parameters are within guidelines established by operational agreements.

(6) Land-based Mobile Radars--Operational agreements with the applicable FAA Regional Coordinators are required when a radar is to be operated at transient locations, such as during military maneuvers. Further coordination is not required when parameters are within guidelines established by operational agreements.

(7) Airborne Radars--Prior national-level coordination is required and operational capabilities and parameters must be established when a radar is operated airborne. Further coordination is not required when parameters are within established guidelines.

4. Applicants shall ensure that the coordination comments of the FAA Regional Coordinator are included on all assignment actions submitted to the Frequency Assignment Subcommittee (FAS). The FAS shall not recommend approval of assignment actions that do not bear the appropriate Coordination Note indicating completion of the coordination required by these procedures (see Annex A and Annex D, Table 1).

5. The NTIA will inform each FAA Regional Coordinator quarterly of all frequency assignment actions affecting the applicable frequencies and bands and areas specified in these procedures.

8.3.17 Procedures for Field Level Coordination, and Coordination with the Aerospace and Flight Test Radio Coordinating Council (AFTRCC), of the Frequency Band 1435-1535 and 2310-2390 MHz

1. Applicability--These procedures are applicable for all frequency assignment actions for use of frequencies in the bands 1435-1535 and 2310-2390 MHz by U.S. Government radio stations within the Conterminous United States, and are implemented to minimize, through local selection of frequencies and effective coordination, the possibility of harmful interference.

2. Field Level Coordinators.

a. Non-Government: The AFTRCC is comprised of representatives of the aerospace manufacturing industry using the Government/non-Government shared 1435-1535 and 2310-2390 MHz bands during the research and development phases of manned and unmanned aircraft, missiles, booster rockets and other expendable vehicles, or their major components. In 1969 the FCC recognized the AFTRCC as the frequency coordinating advisory committee for non-Government flight test telemetry station assignments in the band 1435-1535 MHz, and in 1984 extended this recognition to the 2310-2390 MHz band. The AFTRCC Coordinator (point of contact for coordination) is listed in Annex D, Table 3.

b. Government: The military services, as major users of the radio frequency spectrum during research, development and testing of systems, have established Area Frequency Coordinators (AFCs) that are responsible for coordination of frequency use within designated military ranges or geographical areas of the United States. In 1971 the IRAC agreed that certain military AFCs would be the principal Federal entities responsible for field level coordination of all U.S. Government use of the band 1435-1535 MHz, and in 1984 extended this procedure to include the 2310-2390 MHz band. Annex D, Table 3 lists these AFCs and indicates their areas of responsibility and Figure 3 is a map depicting those areas.

3. Coordination

a. All proposed frequency assignment actions shall be coordinated by the applicant with the appropriate AFC listed in Annex D, Table 3 and Figure 3. The procedures for coordination will be those mutually agreeable to the AFC and applicant concerned.

b. AFCs shall coordinate all proposed frequency assignment actions, except those in the Radiolocation Service, with the AFTRCC Coordinator. AFCs shall notify the AFTRCC Coordinator of all proposed frequency assignment actions in the Radiolocation Service in the 2310-2390 MHz band. The procedures for coordination and/or notification will be those mutually agreeable between the AFTRCC Coordinator and AFC concerned.

c. AFCs will inform applicants of any probability of harmful interference involving proposed frequency assignment actions. If appropriate, the AFC will recommend alternatives and/or restrictions to

preclude interference problems. If the applicant wishes, the AFC will recommend a frequency based on the applicant's requirements and the technical particulars furnished by the applicant. The AFC's comments and/or recommendations to the applicant will be based on authorized spectrum usage within the AFC's area of responsibility, coordination with the AFTRCC, and such additional coordination with other entities and activities which the AFC deems appropriate.

4. Applicants shall ensure that the coordination comments of the AFC are included on all frequency assignment actions submitted to the Frequency Assignment Subcommittee (FAS). The FAS shall not recommend approval of assignment actions that do not bear the appropriate Coordination Note indicating completion of the coordination required by these procedures (see Annex A and Annex D, Table 3).

5. To ensure periodic reevaluation, an expiration date not exceeding five years from the date of authorization or revision is required on each frequency assignment in the bands 1435-1535 and 2310-2390 MHz, except those in the Radiolocation Service in the 2310-2390 MHz band.

6. The NTIA will inform each AFC monthly of all frequency assignment actions affecting the bands 1435-1535 and 2310-2390 MHz in the areas specified in these procedures.

8.3.18 Notification Procedures for the Proposed Use of AGA Channels in the Bands 29.89-50, 162-174, and 406.1-420 MHz

1. Before applying for authority to use an AGA (all Government agencies) channel in the bands 29.89-50, 162-174, or 406.1-420 MHz, the applicant shall notify the FAS of its intent to use that channel through the Automated Data Capture and Forwarding System. The frequency, emission, power, and location of the proposed assignment shall be recorded after ascertaining whether any other agency has notified its intention to apply for the same AGA channel within the last four months.

2. *Coordinating with Other Agencies.* Before submitting an Application for Frequency Assignment Action, the applicant shall coordinate with any other agency(ies) whose existing or proposed operations might be affected by the applicant's use of the

frequency.

3. *Period of Validity.* The requesting agency shall submit its application to the FAS not later than two months from the time of notification. If the application is not submitted within this period, the foregoing notification procedure shall be repeated by the applicant.

4. *Exceptions.* The following uses of AGA channels are excluded from the above requirements:

a. *Wide area use* of those frequencies listed in Section 4.2.3.

b. *Common use* of those frequencies listed in Section 4.2.4.

c. *Hydrologic use* of those frequencies listed in Section 4.3.3. (Note, however, that non-hydrologic use of these frequencies must be notified in accordance with paragraphs 1 and 3 above.)

8.3.19 Coordination of Assignments in the Band 406.1-410 MHz to Stations (Other Than Mobile) in the Vicinity of Certain Radio Astronomy Observatories

In order to minimize possible harmful interference to radio astronomy observations, all proposed frequency assignments in the band 406.1-410 MHz to stations (including stations to be established under group authority), other than mobile stations, within the following areas, shall be coordinated by the applicant through the National Science Foundation, 4201 Wilson Boulevard, Room 1030, Arlington, Virginia 22230, Telephone: 703-306-1823.

Arecibo Observatory

Rectangle between latitudes 17°30' N and 19°00' N and between longitudes 65°10' W and 68°00' W.

Owens Valley Radio Observatory

Two contiguous rectangles, one between latitudes 36° N and 37° N and longitudes 117°40' W and 118°30' W, and the second between latitudes 37° N and 38° N and longitudes 118° W and 118°50' W.

Sagamore Hill Radio Observatory

Rectangle between latitudes 42°10' N and 43°00' N and longitudes 70°31' W and 71°31' W.

Table Mountain Solar Observatory (NOAA) Boulder, Colorado (407-409 MHz only)

Rectangle between latitudes 39°30' N and 40°30' N and longitudes 104°30' W and 106°00' W or the Continental Divide, whichever is farther east.

8.3.20 Coordination of Assignments to Stations (other than Mobile) to be located in the Vicinity of the Table Mountain Radio Receiving Site, Boulder, Colorado

In order to minimize possible harmful interference at the Table Mountain Receiving Site of the Department of Commerce Boulder Research Laboratories, Boulder County, Colorado, all proposed frequency assignments to stations (including assignments to stations to be established under group authority), other than mobile stations, within specified conditions of power and radial distances from a central point on the Table Mountain Receiving Site (coordinates, 40°07'50" N latitude, 105°14'40" W longitude) as given below, shall be coordinated prior to authorization with the Radio Frequency Management Coordinator, Department of Commerce, Boulder, Colorado 80303; telephone 303-499-1000, ext. 6548 (FTS 323-6548).

The conditions of power and radial distances are:

1. All stations within 2.4 kilometers.
2. Stations with 50 W or more ERP within 4.8 kilometers.
3. Stations with 1 kW or more ERP within 16 kilometers.
4. Stations with 25 kW or more ERP within 80 kilometers.

Field strengths of any radiated signals (excluding reflected signals) received on this 1800 acre site resulting from the operation of radio stations authorized after January 1, 1973, or from the modification or relocation of stations authorized after that date, should not exceed the following instantaneous values:

Frequency Range	Field Strength (mV/m) in Authorized Bandwidth of Service	Power Flux Density* (dBW-m ²) in Authorized Bandwidth of Service
Below 540 kHz	10	-65.8
540-1600 kHz	20	-59.8
1.6-470 MHz	10	-65.8**
470-890 MHz	30	-56.2**
Above 890 MHz	1	-85.8**

* Equivalent values of power flux-density are calculated assuming a free-space characteristic impedance of 20π (approximately 376.7) ohms.

** Space stations shall conform to the power flux-density limits at the Earth's surface specified in Section 8.2.36, but in no case should exceed the above levels in any 4 kHz band for all angles of arrival.

The field strengths as given above should be determined in accordance with current engineering standards and practices.

The foregoing is not intended to establish a policy of exclusion but each proposal will be considered on its merits, on a case-by-case basis.

8.3.21 Coordination of High Frequencies for Projects and Systems Involving Oceanographic Data Transmissions

Radio frequencies in the bands 4162.5-4166.0, 6244.5-6248.0, 8328.0-8331.5, 12479.5-12483.5, 16636.5-16640.0, and 22160.5-22164.0 kHz used for transmission and reception of oceanographic data (which are assigned from the established high frequency oceanographic data transmission bands in Appendix 31 to the ITU Radio Regulations) require specialized coordination procedures. The ITU Radio Regulations (in Resolution 314) also charge a Joint Committee of the Intergovernmental Oceanographic Commission and World Meteorological Organization (IOC/WMO) to develop, in coordination with the IFRB and ITU Member Administrations, "a coordinated plan designed to meet existing and future requirements of all interested Members and Associate Members, for use by stations in the collection of data relating to oceanography in a worldwide system, within the framework of provisions made by the present Conference for such a system; this plan to include the geographical distribution of oceanographic stations, their system of operation, the deployment of frequencies in the system and the manner in which oceanographic information is to be transmitted."

Resolution 314 also provides "that administrations be encouraged to assign frequencies in conformity with the plan and the recommendations of IOC and WMO for the portion of the worldwide system over which they have jurisdiction" and "that the IOC and WMO be invited further to assume jointly the responsibility, in consultation with the IFRB, for keeping such a plan current, in the light of changing requirements for data relating to oceanography."

Accordingly, any operational use of the Appendix 31 oceanographic data transmission frequencies should be in accord and/or compatible with the Plan(s) developed by the IOC/WMO, if international protection and IFRB registration are desired.

8.3.22 (Reserved)

8.3.23 Coordination of Assignments to Government Broadcasting Stations (other than international broadcasting)

1. Proposed assignments to Government broadcasting stations (AM, FM, and TV) within areas where the FCC exercises jurisdiction over non-Government radio services in the bands 535-1605 kHz (AM), 54-72 MHz (TV), 76-88 MHz (TV), 88-108 MHz (FM), 174-216 MHz (TV), and 470-806 MHz (TV), shall be coordinated with the FCC Liaison Representative, IRAC. General criteria applicable to such Government broadcasting are:

A. The use of a broadcasting frequency by a station licensed by the FCC, as prescribed in its rules and standards, shall not be restricted or precluded.

B. The station shall not provide service to civilian populations being served by non-Government broadcasting stations, except in emergencies.

C. The station shall not cause harmful interference, as determined under FCC rules, to FCC-licensed broadcasting stations or to stations in other countries in contravention of existing treaties or agreements.

D. Operation of the station shall be discontinued upon notification by the FCC that harmful interference is being caused to any authorized non-Government broadcasting station.

E. Concurrence by the FCC may be reconsidered if continued operation is judged to impede the orderly development of private broadcasting or otherwise contravene the public interest.

F. Proposals shall be coordinated with the FCC at least 80 days before the operation is expected to commence.

G. The following general limitations shall apply to Government broadcasting stations:

1. Medium wave AM, TV, and FM stations (except for G 2 below) will not be authorized within the conterminous United States. This restriction does not apply to translators. (See II B below.)

2. Government low power educational FM stations in the conterminous United States will be limited to Government educational institutions offering curriculums similar to those of private or state supported colleges and universities.

2. Such request for coordination with the FCC shall contain the following information:

A. For all proposals:

1. Frequency
2. Transmitter power (rated)
3. Name of transmitter location
4. Antenna location (latitude/longitude)
5. Bandwidth/emission
6. Definition of the area to be served (preferably on a local map)
7. Applicable IRAC record notes
8. Letter of consent from the owner of commercial and educational stations if their programming is to be rebroadcast or retransmitted.
9. Statement indicating why the service desired is not available from commercial or educational stations.
10. Identity of broadcasting stations presently providing service to the area (AM, FM, and TV stations, including translators).
11. Identity of broadcasting stations considered in electromagnetic interference or feasibility studies and the potential interference impact upon them from the proposed operation.

B. For FM and TV proposals, the following is also required:

1. Effective radiated power
 2. Antenna type and gain
 3. Antenna height above mean sea level
 4. For translators furnish height above ground.
- For other operations provide antenna height above average terrain:

(a) Average elevation of terrain along each of 8 radials from 3.2 to 16 kilometers from antenna at 45 degree azimuth intervals starting at zero degrees azimuth.

(b) Average elevation of all 8 radials.

5. Plot of the horizontal and vertical field intensity radiation patterns if a directional antenna is used (including beam tilt).

C. For AM broadcast proposals for transmitters of 100 watts output power or more, the following additional information shall be supplied in order for the FCC to make its studies and to provide the required international notifications pursuant to applicable international broadcasting agreements (not related to IFRB notifications):

1. The power into the antenna feed point, if

significantly different from the transmitter output power.

2. Description of antenna system to include, but not limited to the following:

- (a) Effective radiating height
- (b) Diagram of top-loading or sectionalizing, if used
- (c) Number of ground systems radials and radial length
- (d) *For omni-directional antennas*--Predicted unattenuated radiated field (mV/m/kW)
- (e) *For directional antennas*--The directional antenna radiation patterns; horizontal only for daytime and horizontal and vertical angles for nighttime operations at increments of 10° through and including 60° in the vertical. Also, the theoretical values for each tower of field ratio and current phase angle, and tower placement sketch showing spacing and orientation of towers.

8.3.24 Coordination of Frequencies Used for Communications with Non-Government Citizens Band Stations

1. A government radio station may utilize frequencies in the range 26960-27410 kHz which are allocated to the Citizens Band (CB) Radio Service under Part 95, Subpart D of the FCC Rules provided

- a. an appropriate showing can be made by the applicant that such an assignment is necessary for intercommunications with non-Government stations, and

- b. the requirement is coordinated with and concurred in by the FCC.

2. All operations by Government stations under this provision shall be in accordance with FCC Rules and Regulations Part 95, Subpart D. Transmitters shall be operated only by employees of the Federal Government and only for the purpose of interfacing with non-Government licensees to coordinate essential and mutual activities. The authority shall be subject to being revoked by the FCC at its discretion at any time. These assignments shall include record note S348.

3. The specific channels are:

Channel	Frequency (kHz)
1	26965
2	26975
3	26985
4	27005
5	27015
6	27025
7	27035
8	27055
9	27065
10	27075
11	27085
12	27105
13	27115
14	27125
15	27135
16	27155
17	27165
18	27175
19	27185
20	27205
21	27215
22	27225
23	27255
24	27235
25	27245
26	27265
27	27275
28	27285
29	27295
30	27305
31	27315
32	27325
33	27335
34	27345
35	27355
36	27365
37	27375
38	27385
39	27395
40	27405

8.3.25 Coordination Procedures For the 932-935 MHz and 941-944 MHz Bands

The frequencies shown in Section 4.3.14 are shared by the Government and non-Government on a co-equal basis for the Fixed Service. Although coordination and frequency assignment procedures are unique to Government and non-Government users, these procedures are similar enough to allow for concurrent processing of applications.

a. For filing applications, Government and non-Government applicants will continue to use the existing procedures; i.e., Government applications will be submitted to the NTIA and non-Government applications will be submitted to the FCC.

b. Non-Government applications will be provided to the NTIA by the FCC through their FAS representative, and Government applications will be provided to the FCC's FAS representative by NTIA. To effect Government/non-Government coordination, both Government and non-Government applications will be placed on the FAS agenda and will be listed in a public notice to be released by the FCC.

c. The following data fields are identified as the minimum necessary for Government/non-Government coordination:

FAS docket number (DKT), frequency (FRQ), emission characteristics including bandwidth (EMS), output power (PWR), station class (STC), transmitter state/country (XSC), transmitter antenna latitude and longitude (XLA, XLG)^{14,15}, transmitter antenna dimensions (XAD)¹⁵, transmitter antenna polarization (XAP)¹⁵, transmitter antenna azimuth (XAZ)¹⁵, receiver state/country (RSC), receiver antenna latitude and longitude (RLA, RLG)^{14,15}, receiver antenna dimensions (RAD)¹⁵, receiver antenna polarization (RAP)¹⁵, and receiver antenna azimuth (RAZ)¹⁵.

Endnotes for Chapter 8

1. Authorization in the fixed service with Note S362 are not construed to come within the term "domestic fixed service".
2. e.g.--First octave: 2.075 to 3.975 MHz, 20 channels spaced 100 kHz.
Second octave: 4.150 to 7.950 MHz, 20 channels spaced 200 kHz.
Third octave: 8.300 to 15.900 MHz, 20 channels spaced 400 kHz.
Fourth octave: 16.600 to 31.800 MHz, 20 channels spaced 800 kHz.
For those sounders in which the tuning rate is independent of the pulse rate (e.g., Sounder Types C2, C3, and C4) wherein the specific frequencies sounded differ from scan to scan, a channeling plan is not a meaningful item. On applications for such sounders, so state.
3. Hearing before Merchant Marine Subcommittee, Committee on Commerce, U.S. Senate, Serial No. 91-98, p. 29.
4. For vessels navigating on those waters governed by navigation rules for the Great Lakes and their connecting and tributary waters, see the following sub-section entitled "Bridge-to-Bridge" Communications for Vessels Navigating on the Great Lakes."
5. Where the Act describes vessels in "gross tons," a useful conversion is: Each 100 cubic feet of enclosed space is equivalent to one gross ton.
6. Reference 40 Federal Register 87 (May 5, 1975).
7. For their own protection receiving stations in the fixed or mobile services operating in bands shared with space radiocommunication services (space-to-Earth) should also avoid directing their antennas toward the geostationary satellite orbit if their sensitivity is sufficiently high that interference from space station transmissions may be significant.
8. θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plan and negative below it.
9. The power flux density limits applicable in the exclusive non-Government frequency bands are contained in RR 2552 through RR 2585 of the ITU Radio Regulations.
10. The level of accepted interference shall be fixed by agreement between the administrations concerned, using the relevant ITU-R Recommendations as a guide.
11. Space stations in the broadcasting-satellite service on geostationary satellites operating in the band 11.7-12.7 GHz are exempted from these provisions but shall maintain their positions in accordance with Appendix 30 of the Radio Regulations.
12. Transmitting antennas of space stations in the broadcasting-satellite service operating in the band 11.7-12.7 GHz are not subject to these provisions but shall maintain their pointing accuracy in accordance with 3.14.1 of Annex 8 to Appendix 30 of the Radio Regulations.

13. For this procedure END USER is defined as those Federal entities operating land mobile radios in a FCC licensed SMR system on a contractual basis and duly authorized by NTIA.
14. The degree of accuracy of all latitudes and longitudes shall be to the nearest second.
15. For applications bearing Special Note S361 or S362, the rules of Section 9.8.2 apply.

(Last page in Chapter 8)